

CAI
UA
-76G64



Governmental
Publications

Great Lakes Megalopolis

From civilization
to ecumenization

Edited by: Alexander B. Leman
Ingrid A. Leman



Ministry of State
Urban Affairs Canada

Ministère d'État
Affaires urbaines Canada

Great Lakes Megalopolis

From civilization
to ecumenization

Edited by: Leman Group Inc.
Alexander B. Leman
Ingrid A. Leman

Volume based on the proceedings
of the Great Lakes Megalopolis
Symposium held in Toronto City Hall,
March 24-27, 1975, Canada

Reproduction quality of illustrations in the book is not uniform since some of them have been reproduced from other publications as the sources indicate.

The views expressed are those of the authors of the papers presented at the Great Lakes Megalopolis Symposium, the views of participants in the Symposium, and the views of the editors of this publication, who determined in large part the content of this volume. These views do not necessarily represent those of the Ministry of State for Urban Affairs.

Published under the authority of
The Honourable Barney Danson, P.C., M.P.
Minister of State for Urban Affairs

© Minister of Supply and Services Canada 1976

Available by mail from

Printing and Publishing
Supply and Services Canada,
Ottawa, Canada K1A 0S9

and at Canadian Government Bookstores:

HALIFAX
1683 Barrington Street

MONTREAL
640 St. Catherine Street West

OTTAWA
171 Slater Street

TORONTO
221 Yonge Street

WINNIPEG
393 Portage Avenue

VANCOUVER
800 Granville Street

or through your bookseller

Catalogue No. SU31-31/1976

Price: Canada: \$4.00
Other countries: \$4.80

Price subject to change without notice
Also published in French
Cat. No. SU31-31/1976F
ISBN 0-660-00376-7

Contents

Foreword v

Acknowledgements vi

Preface vii

Papers Presented ix

1	Megalopolis — What is it?	1
1.1	The Concept of Megalopolis: Keynote Address	1
1.2	Does Megalopolis Exist?	7
1.3	Perceptions of Megalopolis	12
1.4	Is "Megalopolis" Useful for Planning?	16
1.5	Megalopolis: A Step towards Ecumenization	18
2	Big Pattern Changes	27
2.1	Human Technology-Extensions	28
2.2	Universe is Trying Hard to Make Man a Success	30
2.3	Human Settlements: Window to Contemporary Reality	35
3	Humane Megalopolis	39
3.1	Man is the Measure	39
3.2	Building Anthropopolis	40
4	The Great Lakes Megalopolis	51
4.1	Importance of the GLM	51
4.1.1	GLM: Continental Hinge of Global Importance	51
4.1.2	The Total Situation	54
4.2	Emerging Megalopolitan Patterns	58
4.2.1	The Vast System: Present and Future	58
4.2.2	The Urban Detroit Study	60
4.2.3	Northern Ohio Urban System	64
4.2.4	Great Lakes Megalopolis-Canada	66
4.2.5	Windsor-Quebec City Urban Axis	73
4.3	GLM Today: A System Without Balance	77

5	What are the Issues?	81
5.1	Time	81
5.2	Knowledge	82
5.3	Megalopolis Seems Unmanageable	83
5.4	Wealth and Power of Megalopolis are Resented by Outsiders	84
5.5	Spatial Imbalances Cause Concern	85
5.6	Environment that Debases Human Condition	85
5.7	Political and Moral Dilemmas	88
5.8	Obsolescence of Power Politics	90
6	What are the Means?	95
6.1	Governance	95
6.1.1	Is Megalopolis Governable?	95
6.1.2	The Actors within the Process	97
6.1.3	Boundaries can be Useful	100
6.1.4	Beginning the Process of Governance	101
6.2	Nature and Megalopolis	103
6.2.1	Water Management	103
6.2.2	Restoration of the Eco-System	104
6.3	Networks are the Key	104
6.4	The Best Possible Means	106
7	Summary Statement	107
	The Door Opens . . .	109
	Glossary	111
	Notes	113
	Co-Chairmen	115
	Participants	115

Tables

1	The Axis Compared with other Elongated Urban Agglomerations	10
2	Megalopolitan Strength	70
3	Megalopolitan Indices	70
4	The Expected Concentration of Population around Toronto and Montreal: 1971 and 2001	76

Figures

1	Confluence Phenomenon	19
2	Japanese Megalopolis, 1960	20
3	Megalopolitan System in Europe, 2000	20
4	Great Lakes Megalopolis — A Rational Grid	21
5	Universal City or Ecumenopolis a Century from Now	22
6	Ecumenopolis in U.S.A. a Century from Now	24
7	Ecumenopolis: Theoretical Configuration of Global Axis and Centres Adjusted for Distorting Factors	25
8	Accelerations in Discoveries in Science	33
9	A Series of Embracing Contexts	37
10	Standard World Map — Mercator Projection	52

11	Water-Ocean World Centred on Antarctica	53
12	World Population Distribution	55
13	Great Lakes Major Region	56
14	Evolution of the Great Lakes Megalopolis	59
15	Option: Nature within Megalopolis	61
16	The New Physical Structure for Southern Michigan and UDA Deriving from the Emerging GLM	63
17	Megalopolis: A Model of Ekistic Unit 12	68
18	Preliminary Hypothesis: Great Lakes Megalopolis — Canada 1973	71
19	Preliminary Hypothesis: Toronto/Buffalo-Detroit Link 1973	72
20	Windsor-Quebec Axis Extent of Urbanization 1961	73
21	Windsor-Quebec Axis Extent of Urbanization 1971	75
22	Windsor-Quebec Axis Extent of Urbanization 2001	76
23	Major Network Confusion in the GLM-Canada	78
24	Megalopolis Assessment System Model: Assessing the Actors in Megalopolis	98
25	Actor Classification Framework	98

Foreword

The area surrounding the Great Lakes is the most highly urbanized area of Canada. It is inevitable, therefore, that the Ministry of State for Urban Affairs would focus attention on problems in this region. One such effort was the publication in 1975 of Maurice Yeates' Book, *Main Street*, dealing with the corridor between Windsor and Quebec City. We hope that this present volume on the Great Lakes Megalopolis will be another step towards finding satisfactory answers to questions of how to maintain a high quality of life for a large mass of people whose activities are complexly interwoven.

The term "megalopolis" represents the largest existing level of human settlement for the ekistic scale. The World Society for Ekistics was responsible for convening a Great Lakes Megalopolis Symposium in Toronto, March 24-27, 1975 in order to make a contribution to Habitat: The United Nations Conference on Human Settlements. This Symposium, upon which this volume is based, was designed, organized and conducted by Leman Group Inc.,

on behalf of the World Society for Ekistics. After the meetings, the Leman Group Inc. was commissioned by the Ministry to edit and prepare the proceedings for publication. Ms. R. Swann was the Ministry officer responsible for working with the Leman Group Inc. in preparing this volume.

Whether or not one agrees with the ekistical concepts, this volume provides an opportunity to examine the views of some of the best minds in the world. Each has brought his wide-ranging experience and profound knowledge to bear on the problem of human settlements at the megalopolitan scale and has provided insights and perspectives on the plethora of issues involved.

R.W. Crowley,
Acting Director General,
Policy and Research Wing,
Ministry of State for Urban Affairs

Acknowledgements

Typically for this situation, it is not possible to appropriately and fully thank the many whose advice, assistance and good-will, made the Great Lakes Megalopolis Symposium possible and this volume real.

We wish to particularly thank, however, Ms. Radmila Swann, Chief of Policy Advice at the Ministry of State for Urban Affairs, who was an efficient and helpful project director in the course of our work.

Metropolitan Toronto Council and its Planning Board provided the superb setting for the Symposium: the Council Chamber of the Toronto City Hall, as well as other related spaces and facilities, without which, the event would have been more difficult and less memorable. Others who gave generous assistance of varying kinds were the following:

*BASF Canada Ltd., Toronto, Ontario
Bell Canada, Toronto, Ontario
Cadillac-Fairview Corporation, Toronto, Ontario
City Hall Property Department, Toronto, Ontario
Grand and Toy Ltd., Toronto, Ontario*

The Higbee Company, Cleveland, Ohio, USA, for Northern Ohio Urban System Research Project (NOUS)

*I.B.M. Canada Ltd., Toronto, Ontario
Manufacturers' Life Insurance Co. Ltd., Toronto, Ontario
Metropolitan Toronto Council, Toronto, Ontario
Metropolitan Toronto Planning Department, Toronto, Ontario
Metropolitan Trust Co., Toronto, Ontario
Xerox of Canada Ltd., Toronto, Ontario*

The contents of this volume were drawn, of course, from the papers presented at the Symposium as well as from the discussion among the participants and the members of the public in the audience.

In closing we wish to acknowledge the contribution of the World Society for Ekistics: Working Group Canada members in the conceptual development of the Symposium.

Editors

Preface

*Better to light a candle,
than curse the darkness.*

Confucius (550 B.C.)

This volume is addressed to the key decision and policy makers in various fields: governments, private and public institutions, research, business and professions — most importantly, it is addressed to the public at large. It is an instrument for viewing “the contemporary reality” and the fast and profound big pattern changes now under way.

The contents are based on the programme and the proceedings of the Great Lakes Megalopolis Symposion, which gathered people from around the world to consider “megalopolis” generally, and the Great Lakes Megalopolis specifically. Participants represented various disciplines, and brought diverse outlooks to the Symposion.

The text is not a transcript of the papers presented and of the discussion which ensued — but is an edited assemblage of issues and views based on such papers and the discussion; it is directed at an area of urbanization, where there is a great lack of information at present.

Fifteen years ago, not many people were interested in the problems of urbanization; only a few could read the signs of the impending developments; most were not even aware of what was going on. Today, the multitudes are cursing the problem.


In this volume, hopefully a candle is lit by people who “. . . are thinking about human settlements . . . because we care about people and how they live . . .”

The volume will be useful to those who must act within the GLM, as well as to those elsewhere around the world, who are aware that they already are, or will soon be facing similar problems.

The reader should be aware that the words of the participants are in “roman type” while the words of the editors are in italics.

In closing, the editors assume the responsibility for including or excluding specific portions of the original 420-page transcript. Many superb thoughts and many parts of excellent papers, had to be left out, to achieve a volume of manageable size.

Editors



Digitized by the Internet Archive
in 2023 with funding from
University of Toronto

<https://archive.org/details/39251609050020>

Papers Presented

Blumenfeld, Hans University of Toronto, Canada	<i>Megalopolis, Metropolis and Networks</i>	Isomura, Eiichi Toyo University, Tokyo, Japan	<i>Megalopolis in Asia: A Comparative Study</i>
Christakis, Alexander N., Georgetown University, Washington, D.C., U.S.A.	<i>Ekistic Networks</i>	Langan, Thomas University of Toronto, Canada	<i>On Being At Home in Megalopolis</i>
Coblentz, H.S., University of Waterloo, Ontario, Canada	<i>Perceptions of a Megalopolis</i>	Lea, Norman D., N.D. Lea and Associates Ltd., Oakville, Ontario, Canada	<i>Transportation and Megalopolis</i>
Doxiadis, Constantinos A., Doxiadis Associates International Co. Ltd. Athens, Greece	<i>Organizing Efforts Towards a Desirable and Feasible Great Lakes Megalopolitan System</i>	Leman, Alexander B., Leman Group Inc., Toronto, Canada	<i>The Great Lakes Megalopolis-Canada</i>
Fischer, David W., and Keith, Robert F., University of Waterloo, Ontario, Canada	<i>A Suggested Framework for Evaluating the Megalopolis Assessment System</i>	Lourie, Reginald S., Children's Hospital of D.C. Washington, D.C., U.S.A.	<i>Human Development</i>
Fuller, R. Buckminster University City Science Centre, Philadelphia, U.S.A.	<i>Big Pattern Changes</i>	Maltby, James Doxiadis Associates Inc., Washington, D.C., U.S.A.	<i>The Urban Detroit Area Research Project</i>
	<i>Obsolescence of Politics</i>	McLuhan, H. Marshall University of Toronto, Canada	<i>Networks for Ideas</i>
Francis, George R., University of Waterloo, Ontario, Canada	<i>Governance of Megalopolis: An Approach Based on Resource Management Considerations</i>	Mead, Margaret American Museum of Natural History, New York, U.S.A.	<i>Man in Megalopolis</i>
Gottmann, Jean University of Oxford, England	<i>Megalopolitan Systems Around the World</i>	Murphy, Earl F., Ohio State University, Columbus, Ohio, U.S.A.	<i>Special Purpose Governance Systems</i>
	<i>*Quaternary Functions in Megalopolis</i>	Nash, Peter H., University of Waterloo, Ontario, Canada	<i>The Megalopolitan Common Market — An Evolving Opportunity</i>
Hare, F. Kenneth University of Toronto, Canada	<i>The Great Lakes as a Natural System</i>	Papaioannou, John G., Athens Center of Ekistics, Athens, Greece	<i>The Great Lakes Megalopolis Within Ecumenopolis — Its Problems, Its Opportunities</i>
Havlick, Spenser W., California State University San Jose, U.S.A.	<i>The Governance of Megalopolis: The Responsiveness to Governance Systems</i>		

Psomopoulos, Panayis
Athens Center of Ekistics,
Athens, Greece

*Man in the Megalopolis: Problems and
Opportunities*

Seliga, Thomas A.,
Ohio State University,
Columbus, Ohio, U.S.A.

Air Pollution in Megalopolis

Strawbridge, Herbert E.,
The Higbee Co.,
Cleveland, Ohio, U.S.A.

The Northern Ohio Urban System

Wolfe, Roy S.,
York University,
Toronto, Canada

**Outdoor Recreation in Megalopolis*

Yeates, Maurice
Queen's University,
Kingston, Ontario, Canada

The Windsor-Quebec City Urban Axis

*Not available to date.

Copies of all papers (except those marked *) are available from:

Leman Group Inc.
87 St. Nicholas Street
Toronto, Ontario
M4Y 1W8
Cable: LEMANGROUP
Telephone: (416) 964-1865

1 Megalopolis — What is it?

The term “Megalopolis” conjures in the mind of an average person, images of bigness which bring with it all the conceivable evils of man’s interference with the natural world while engaged in “city-building”.

Misconceptions such as these must be removed if for no other reason than to avoid their self-fulfillment. In this case, however, because of the immensity of the phenomenon which we call “Megalopolis” and because of the intensity of the impact it will increasingly have within its own areas as well as much beyond — it is a matter of some urgency that proper understandings and rational assessments supplant misconceptions and misapprehensions.

In his keynote address to the Symposium, Professor **Jean Gottmann** presents updated characteristics of the megalopolis which are this time applicable generically to the megalopolis as a phenomenon rather than to the specific Eastern Seaboard Megalopolis between Boston and Washington.

Having reintroduced the concept of megalopolis to the twentieth century through his epic work in 1961, **Gottmann** here provides not only the definitions of megalopolitan characteristics but also proceeds to discuss the problems and issues arising. While viewing the emergence and growth of a megalopolis as a natural and positive development, he cautions us about certain aspects which require attention in the highest places: What in a megalopolis is unmanageable? How serious is the resentment of those who are “outside” and who do not benefit but may even suffer? What are the consequences of spatial imbalances within a nation or even within the continent? Do the large urban structures and institutions in fact crush the individual and deny human dignity?

While a number of participants in their papers and through discussion, examine various aspects of megalopolis generally, and of the Great Lakes Megalopolitan Chain specifically, some, notably Professor **Hans Blumenfeld** deny the very existence of the megalopolis as a phenomenon, and Professor **Yeates** doubts its emergence in Canada or its usefulness as a planning instrument generally.

Dr. **Peter Nash** and Professor **H.S. Coblenz**, discuss two different approaches to the perception of megalopolis and of large urban systems generally; Professor **Eiichi Isomura** introduces a point that ideology tends to strongly affect the perception of a phenomenon as a whole, as well as its parts.

With the benefit of a keen perception of time, Professor **John Papaioannou** traces the more recent history of the emergence and growth of large urban

systems. Relying on the ekistic logarithmic scale of space/size dimensions of human settlements, **Papaioannou** places the megalopolitan developments of today into the space/time setting of the period to follow in the next century or two.

Chapter 2 then addresses some of the major historical questions such as why megalopolis came about, what it means and where it will lead us.

1.1 The Concept of Megalopolis: (Keynote Address)

Professor **Jean Gottmann’s** keynote address to the Symposium is a paper of two kinds: first, it is a definitive statement on characteristics of a megalopolis; second, it is a source of carefully considered questions arising in the mind of a foremost investigator of large urban systems after a generation-long period of observation and study around the globe.

Urban history is the history of redistribution of labour and of the reallocation of responsibilities and roles within societies. Emergence and growth of vast chains of human settlements bring about profound social, economic and political dislocations.

The Great Lakes Megalopolis is bigger than any settlement in Canada or the United States; is smaller than either of the Canadian provinces which are a part of it; knows no provincial, state or national boundaries; is an orphan under no-one’s jurisdiction but is something many are afraid of, and most would prefer to avoid; yet, it will neither go away nor disappear. In fact, there is every sign that it will continue to grow more rapidly than other areas outside of it.

In his conclusion, Professor **Gottmann** points out that “Megalopolis is a spectacular and fascinating phenomenon. Facts so huge and so stubborn can only be caused by the convergence of many powerful and sustained forces.”

The convening of this Symposium in Toronto demonstrates that my early use of the term megalopolis specifically to designate only the great urbanized system on the northeastern seaboard of the United States, that is the urban complex from Boston to Washington, is by now outdated. “Megalopolis” has become a concept applied to a variety of urban areas existing and expanding in different parts of the world. The convening of this Symposium

also emphasizes that the concept of megalopolis is not outdated at all, but very much alive and requiring attention. In fact, about two years ago, I found myself in Tokyo addressing a meeting called to discuss a research project aimed at a comparative study of the various megalopolises in the world.

Our conference here is to focus more specifically on the Great Lakes Megalopolis, the vast complex of metropolitan and urbanized areas that straddles the boundary between Canada and the United States and winds around the networks of waterway and water spaces of the St. Lawrence and the Great Lakes. To give an idea of the scope of the concept and of the related problems, I shall only say that it may be envisaged as extending from the City of Quebec in the east to the metropolitan area of Milwaukee in the west, including such great agglomerations as Montreal, Ottawa, Toronto, Detroit, Buffalo, Cleveland and Chicago, to mention only a few major nuclei (*See Chapter 4*). Measured on this scale, the Great Lakes Megalopolis is probably the largest in area of the present megalopolitan systems. To begin the discussion, it would be helpful, I think, to define the megalopolitan concept as it applies today, and see what the general features of megalopolitan systems may mean to the understanding of this Great Lakes Megalopolis.

The Concept

The concept of megalopolis, in my view, applies to a very large polynuclear urbanized system endowed with enough continuity and internal interconnections that it can be considered a system in itself. A megalopolis must also be separated by less urbanized broad spaces from any other large urban network that it does not encompass. In most cases, the density of population, of urban activities and of interweaving internal networks within a megalopolitan region is such as to make it substantially different from surrounding areas that do not possess the same mass and density of population and a comparable intensity of urbanization.

Existing Megalopolises

Before we can list the existing megalopolitan systems, it is necessary to agree on a minimum size for the phenomenon. A number of works published on the concept and occurrences of megalopolis set a concentration of 10 million inhabitants within the area as the minimum size. This is much below the figure I have long advocated and would still prefer to propose: I would set the minimum at 25 million. If we accept this figure, the list of megalopolitan systems will be much shorter and every case will be endowed

with certain characteristics which I believe are common to the whole lot and basic to the concept. There are indeed six cases of such, over 25 million each, megalopolitan occurrences in the present world: first, the American Northeastern Megalopolis, the study of which has served as the prototype of the concept; then the Great Lakes Megalopolis, described by Constantinos Doxiadis and by Alexander B. Leman; the Tokaido Megalopolis in Japan, which has been carefully studied under the direction of Eiichi Isomura; the Megalopolis in England which has been identified and analysed by the team directed by Peter Hall; the Megalopolis of northwestern Europe, extending from Amsterdam to the Ruhr and to the French northern industrial conglomeration, described by I.B.F. Kormoss and now being studied by an international team at the Hague; and a sixth case of which we yet know relatively little, the Urban Constellation in Mainland China centred on Shanghai.

To these six cases, we may soon be able to add three others located on different continents; in each of these cases, the different parts seem to be coalescing fast enough to be considered megalopolitan systems in their own right and the populations of each seem close to my proposed minimum of 25 million inhabitants; one consists of two big nuclei that are growing fast and are being linked by a narrow corridor, that is, the Rio de Janeiro-Sao Paulo complex in Brazil; another, differently-shaped megalopolis is forming in northern Italy, centred on the Milan-Turin-Genoa triangle and extending arms along the Mediterranean seashore southward to Pisa and Florence and westward to Marseilles and Avignon. The third case will probably be in California, centred on Los Angeles, extending northward to the San Francisco Bay area and encompassing urban centres along both sides of the Californian-Mexican border. There may already be some formation of megalopolitan size and structure in India, but I have as yet no clear information on that part of the world.

If we lower the minimum size of population to 10 million, as has been proposed by some of the students of megalopolis, the number of megalopolitan systems would rise rapidly, and in a disputable fashion; on the one hand, many mononuclear urban agglomerations could be identified at about the 10 million size, for instance, around Paris, Buenos Aires, Calcutta, Bombay, perhaps Moscow, etc.; on the other hand, by accepting the 10 million gauge, we would be justified in breaking up the concept of the larger megalopolitan systems into places, some of which could then be considered independently of the adjacent and interconnected parts, so that Greater New York would be considered a megalopolis on its own, as would be London, with its southeastern crown; the Ruhr-Cologne complex, the Tokyo-Yokohama and Osaka-Kobe metropolitan regions, etc. The Great Lakes Megalopolis could then be dissected into several sections, each in the

10 to 15 million size; one around Chicago and Milwaukee, another in the Detroit/Cleveland sector, and still another in Canada from Hamilton to Quebec. The general view of the interconnected vaster system would be lost.

The important idea to keep in mind is that megalopolis is not simply an overgrown metropolitan area. It is not only another step on the quantitative scale. It is a phenomenon of specific quality, of a different nature: and this is what I shall now proceed to analyze.

Characteristics

If you allow me at present to limit my discussion of megalopolitan systems to the six to nine cases pertaining to the larger and truly megalopolitan category, I think we can point to a certain number of interesting characteristics, which are fundamental to our understanding of the phenomenon.

Hinge

The megalopolitan systems have arisen along polynuclear, rather elongated axes. Sometimes the system takes on an irregular or a triangular shape, as has happened in Europe, but there is always a major axis of traffic and communication, and the nuclei strewn along it have a national and international function. For my original American Megalopolis, I used the metaphor of the "continent's economic hinge" to describe its major function throughout history. All megalopolitan regions have been hinged in terms of trade, and cultural, technological and population exchanges between the countries they belonged to and the outside world they participated in. This is obviously true of the past and present functions of the systems that have grown along an axis such as Boston-New York-Washington, or Tokyo-Osaka, or London-Liverpool or Amsterdam-Antwerp-Brussels-Cologne, or Montréal-Toronto-Detroit-Chicago. It seems that a necessary condition of a megalopolis is a hinge articulating two or more networks, one of them a national internal network, and another an international and overseas network. Hence the importance of the seaport function of some of the major bolts forming the hinge. It may be noteworthy that of the large megalopolitan systems, the axis of only one is not directly related to a seaboard, and that is the Great Lakes Megalopolis. Still, it extends along a system of navigable waterways forming an international boundary.

Water transport and peripheral location were especially important in the past, when all transport went by surface means, when ships were by far the cheapest mode of transport, and when the essential breaking points in the networks of transport and communications were located on the shores of the land masses. Water and especially sea transport still preserves some

importance owing to the great ease and lower cost of shipping large cargoes by water. A large concentration of population and industry consumes huge quantities of goods. Megalopolitan growth occurs in highly developed countries, where the per capita consumption of goods and services is much larger than average. Hence the intricate web of networks to carry goods, people and messages within and around a megalopolis. Looking at the various maps of means of transport and communication and of traffic flows around the world, one is impressed by the extent to which the existing webs enveloping our planet converge on the main hubs of the megalopolitan systems.

The convergence is increased by the part played by the hinge in the handling of an enormous volume of transactional activities resulting from the linkages in the networks connected by the hinge. I am convinced that the expansion in the volume of the transactions and in the personnel they occupy, explains the rise of the megalopolitan system and its relations to other parts of the world. The recent evolution of technology and society transferring large numbers of people from production work, producing or processing materials, to work in the services, in transactions, in the processing of information is largely responsible for the megalopolitan phenomenon.

I have been looking at megalopolitan regions as yet from the outside, considering each of them as a self-contained system somewhat different from the environing area. Let us now consider its inner structures.

Density of linkages

The first characteristic of a megalopolitan region is its density of settlement. The megalopolis concentrates a large proportion of a country's population, at least one-fifth, on a small fraction of the land area. This results in relatively high densities of population on the average (over 250 per square kilometer) and a great density of nuclei of a particularly urban character — of towns and cities in which the population density is still much higher than the average in the megalopolitan region. This pattern of a thick network of towns and cities within megalopolis is a very important characteristic; it entails more proximity between the constituent parts and therefore a more intertwined web of relationships between a variety of distinct urban centres. The web of relationships is expressed partly in a physical infrastructure consisting of highways, railways, waterways, telephone lines, pipelines, water supply and sewage systems crisscrossing the whole area, and partly in more fluid networks, some of them visible and measurable, such as the flows of traffic, the movement of people and goods, the flows of telephone calls, of mail and of financial instruments. The same web includes other networks of a more abstract and rather invisible nature, such as common interests

and concerns, rivalries or cooperation, exchanges of information and the human relations that make for community life.

The density of these linkages, material or abstract, can to some extent be perceived in the landscape as one travels through or flies over a megalopolitan area; the pattern of lights on the ground seen from an airplane on a clear night vividly demonstrates this greater density. All these densities and linkages are even better expressed by maps which illustrate clearly the variations of intensity for certain types of linkages and of land uses that are more concentrated in certain sectors of the megalopolitan region than in others.

The superimposed networks of linkages help make the region more united and more intricately intertwined, creating the interdependence of the various components within the megalopolis, but this fact should not overshadow the diversity and complexity existing in the megalopolitan structure. The sizes and specializations of the various spatial components are extremely varied, as demonstrated by the diverse characteristics of the cities, towns, villages, suburban and rural areas that form the vast system. In each sector along a megalopolitan axis that may be endowed with some greater unity because of its dependence on one or two major metropolitan centres, there is still diversity in the land use, in the people, in the occupations and interests. No megalopolitan region is as yet completely and fully urbanized in the sense of being totally covered with building at a thick density. There are interstitial spaces, some reserved for recreation, some for other special uses (such as water reservoirs, for instances), some for agriculture of a specialized and usually intensive kind, and some are wooded.

In my study of the American Megalopolis, published in 1961, I reported that in the mid-fifties, almost half of its area as I had defined it, (more precisely 48 percent) was under commercial forest cover. A recent enquiry made by another research project of the Twentieth Century Fund has shown that in the late sixties, within the limits I had assigned to that megalopolis, 49 percent of the total area was still under forest of commercial value. In the intervening 15 years of population of megalopolis, the suburban sprawl had substantially expanded; however, there has been apparently enough abandonment of tilled land or pastures, which were turned into woods, to cause a small increase in the total area of commercial forest. These trends will not continue forever; they reflect a complex interplay of economic and social processes. But I insist on the role that forest and agricultural land still play in spatial terms within the megalopolitan structure, involving not only land use but various aspects of the region's way of life and its resources in terms of amenities as well as supplies of certain goods. This is true, of course, of megalopolis on the American northeastern

seaboard; it is also true, and to an even greater extent, of the Great Lakes Megalopolis.

The concept of megalopolis must include the green fringe of the densely built-up corridors. It should not be made into an image of hopeless crowding, of a hall of cement, steel, brick, and motors cars. The appearance of megalopolitan systems coincides in time and in space with societies blessed with more leisure time, more outdoor recreation, and physical and social mobility. The spatial framework of the system incorporates the resources available in the enviroing areas for the needs of high density. New constraints appear, new regulations are desirable. They must be considered in the proper staging, on an adequate scale.

A Social and Economic Mosaic

Within the urban centres, diversity has not been only one of size and site, but it has been compounded by the history of past growth which deposited several layers of economic and technological evolution one on top of another. To an earlier stage of settlement, when cities and towns were chiefly centres of administration, trade and servicing of surrounding rural areas, a layer of industrial revolution was added, piling up manufacturing plants, warehouses and all the attendant infrastructure. Today, it is agreed that in the better developed regions, a third stage has set in. The instruments of heavy manufacturing are gradually moved outside the major metropolitan centres. Now offices cluster in the central business districts of most cities, attracting the institutions that service the new transactional way of life. The evolution of a large sector of the labour force towards white collar employment and work of a quaternary nature, processing various forms of information, has given a new allure to many cities within megalopolis. It is certainly exploding in the landscape of central Chicago, or the skylines of Montreal and Toronto, and even more so in the recent growth of the metropolitan complex of Ottawa. These trends have been recognized in most large urban agglomerations, but they originated and have taken more spectacular shape in the megalopolitan groupings.

The diversity is again increased by the variety of the population. The process of growth and concentration of so many millions of inhabitants on a relatively narrow strip of land has involved many different waves of in-migration. Migrants came into megalopolitan areas from the surrounding regions but also and especially because of the hinge function, many came from afar. As might be expected in this chain of active crossroads and hubs of trade and industry, the population is varied and stems from a great

many diverse origins. Its ethnic and linguistic pluralism must be added to the gamut of occupations, levels of income and social variation that exist in every megalopolitan system; some of this spectrum is found even in the most homogeneous of them, which is certainly the Tokaido Megalopolis.

A megalopolitan system must be described and understood as a huge social and economic mosaic. This term has been, I believe, recently used and accepted in Canada to describe the national structure. It expresses both an indisputable reality resulting from the great fluidity and diversity of the modern world and also rare wisdom in the assessment of human organization. The megalopolitan structure is particularly well described by the term mosaic, because both the land use and the population are formed by an immense number of places of great variety tightly put together and all interdependent; and the diversity of the constituent elements remains well apparent even when one admires the unity of the whole design.

The mosaic is physical, economic and social; it is also political and governmental. The density and fragmentation of the system causes an extremely intricate lacework of administrative and political limits to be woven over the megalopolitan land. This can be clearly seen on a map of units of local government but it also appears strikingly in the distribution of governmental and political divisions on higher levels. It is not a simple accident that the older megalopolitan systems arose along axes which extended across boundaries between states, whether those were some of the original states in the American Federal Republic or the national states that divided among themselves the northwestern corner of the European continent. This political plurality may be both cause and effect of the lively competition between the major cities along a megalopolitan axis as they play their part in the operation of the hinge function. Similar economic competition may have obtained between large cities and industrial centres under the unified rule of one nation under the conditions of a rapidly developing Industrial Revolution, especially within the geographical constraints of an insular kingdom, as at different historical periods must have been the case in Great Britain and Japan. Whatever the difference in the individual cases, it remains that the mass, density and plurality of a megalopolitan mosaic make such a region particularly difficult to manage by governments.

Studies of the megalopolitan phenomenon cannot get away from the extraordinary complexity and ensuing difficulties arising in such a region. But it is necessary to strive for solutions even in such environments. Once we accept that the complexity and the diversity are integral parts of the great fact of complementarity between all the pieces of the mosaic that resulted from the process of growth and concentration, it should be possible to establish solutions on the foundations of plurality and complementarity.

An Incubator

Modern economic theory and analysis has come to recognize that, in the process of economic development, social stability or change, the social, political and institutional trends and forces are more decisive than the purely physical, economic and technological factors. Any regional development of megalopolitan or submegalopolitan scale and nature cannot be understood without acknowledging a special convergence of social, political, and cultural forces. It is in these fields that the answers needed will be found or the causes will be lost. The pressures arising from the megalopolitan circumstances affect both the physical environment, in its natural and man-made elements, and the people in their modes of life. It is not surprising, therefore, that megalopolitan systems have been the framework and location in which many trends have developed, shaping our ways of life. Megalopolis is an incubator of new trends. Change occurs there at a faster and more intensified pace than in a more stabilized and homogeneous area experiencing fewer pressures and problems.

To the characteristics of megalopolis as a hinge and a mosaic, we must add that of its function as an incubator. This function is a threat to habit and stability, because it introduces change. It compounds the difficulties of local governments and of national and international administrations. However, it is their mix of functions and their great dynamism that have made the megalopolitan regions so important in the present world and have bestowed upon them so large a share of the general direction of contemporary economic prosperity and of the general advance of civilization.

The growth of megalopolitan structures and the importance they have assumed testifies to the capacity of these regions and their people to accommodate concentrated and even congested development, and to withstand the pressures these very processes cause within the system. But a few words of caution must be uttered in conclusion.

First, the pressures have reached danger level on many occasions and at times, it has seemed that megalopolitan regions were becoming unmanageable. Secondly, the size and intensity of such concentrations of wealth and power have been resented by other regions of the countries in which megalopolitan systems have arisen. The other regions claim a more equal share in the sum total of the country's population, wealth and power. A too-large portion of these seems held in the megalopolitan areas. There is a basic ethical and political problem inherent in geographical concentration on such a scale. Thirdly, the resulting spatial imbalances cause concern for the future fate of the vaster spaces gradually thinned out, especially for nations with large territories. Fourthly, the very large urban structures are

accused of generating an environment that crushes the individual and debases the human condition.

Finally, the concerns thus aroused, though largely political in nature, also entail moral dilemmas and I would like to give two examples of these. In the much studied decisions on reapportionment by the United States Supreme Court, of 15 June, 1964, a minority opinion opposed the strict application of the "one man, one vote" principle to both houses of the legislature of New York State, arguing that it would leave the inhabitants of large upstate areas at the mercy of the interests and decisions of a megalopolis. To this legal argument may be added a theological one. Twelve years ago, in an interview on Canadian television in Vancouver, the then President of the local Association of Architects asked me to comment on a statement made by the Bishop of that city that Vancouver's growth should be restricted because very large cities were inordinately sinful.

When discussing the organization and the administration of a megalopolis, we must keep these concerns in mind. Many of them stem from long-standing dislikes and distrust of large, dominant cities. We are reminded of the ancient invectives against Nineveh, Babylon and even Rome. In our egalitarian times, flagrant inequalities in the distribution of population and of economic wealth are created by modern urbanization and they come under fire and suspicion. In the more congested parts of megalopolitan systems, the problems do indeed pile up and methods to deal with them are not incubated fast enough to cope with them in adequate fashion.

Now, if megalopolitan growth arouses so much worry and protest, if so many people believe it is a bad thing to occur, how is it that it has developed on such a scale? Despite all the stress, strain and unpleasantness it may cause, urban growth on a huge scale, continues to grow. Despite the endeavours of national and state or provincial governments to spread population and economic opportunity more evenly, the large agglomerations, as a rule, have not shown signs of dissolving. In Canada, despite warnings and measures that favour outlying territory, Vancouver has kept expanding and so has the megalopolitan area from Quebec to Windsor. In fact, during the five intercensal years from 1966 to 1971, Metropolitan Toronto alone added some 205,000 inhabitants, a figure that amounts to more than the total population increase in the same period of the provinces of Alberta, Saskatchewan, and Manitoba, plus the Yukon and the Northwest Territories. As a longer term trend, the large urban agglomerations continue to attract very large numbers of migrants, and of course they also grow because of local natural demographic increase. The peripheral hinges of the continents continue to gather activities of a transactional nature in an era of world-wide economic and political interdependence and complementarity.

Some redistribution in space is, however, occurring either as a result of concerted planning or under the pressure of social and market forces. The formation of megalopolitan, more-or-less continuous axes and networks is in itself the product of deconcentration from the main original nuclei. Older categories of industries are gradually scattering away from the larger and more congested metropolitan centres. Some students of urban affairs even believe that the diffusion of the functions and trends that originated in megalopolitan systems disperses them rapidly to a multitude of other widely scattered towns and cities, particularly in the context of the United States and western Europe. In these countries, and in Canada, the migration off the farms will soon be almost completed and reduced to a trickle. Ultimately, megalopolitan systems will mainly grow through natural increase and international immigration, if allowed.

While diffusion, delegation and decentralization are certainly developing in many respects and on a vast scale, it does not seem, however, from recent trends of migration and population change, that megalopolitan systems are doomed and dissolving. Careful observation of what happens around the world indicates that within the framework of expanding and generalizing urbanization, the old megalopolitan structures still prosper, and new ones arise. Among the six, nine or more cases that I have recognized, the Great Lakes Megalopolis would be today the most interesting to study because of its size, its youth, its outline, its evolution and its international character.

Twenty years ago, the patterns of urbanization along the Great Lakes did not yet seem to be truly comparable in density and functions with the Northeastern Seaboard Megalopolis. A vast chain of metropolitan regions was forming there especially on the American side of the Great Lakes, but with a looser structure and a specialization in manufacturing production rather than in quaternary activities. Now a rapid evolution has taken place modifying the picture and I am much inclined, even in my strict interpretation of the megalopolitan concept, to recognize its rise here. The Canadian sector of the Great Lakes Megalopolis is probably, in the present circumstances, the most megalopolitan indeed, by its rapid development of transactional activities, and by its national and international role as a hinge and as an incubator.

Conclusion

Megalopolis is a spectacular and fascinating phenomenon. Facts so huge and so stubborn can only be caused by the convergence of many powerful and sustained forces. As a product of the twentieth century, it has arisen with mechanization and automation on the farms, in the mines and lately in the manufacturing plants. It has taken shape as the people of the more advanced countries obtained more freedom from constraining work, more

leisure time, more means to consume goods and services, more mobility and more education. It is not simply urban growth on a bigger scale; it is rather a new order in the organization of space and in the division of labour within society, a more diversified and complex order, allowing for more variety and freedom.

As we proceed to discuss the Great Lakes Megalopolis, its problems, its various constituent parts, we shall not be able to treat every aspect and every question on the enormous scale of the whole system. Every piece in the mosaic may require the focus of our attention at a given time. Our total contribution will be much more significant, if we constantly keep in mind the global megalopolitan framework. This will enable us to throw more light on how to improve the human condition in a highly urbanized environment.

1.2 Does Megalopolis Exist?

Does megalopolis really exist? Is the phenomenon real or merely imagined by the sophisticated? Is it inevitable? If it exists, why then such a strange name? — these and similar questions are evident to a varying degree in the following general discussion of the concept of megalopolis.

*Some questioning of its existence was direct and outright, as in **Marshall McLuhan's** comment:*

Megalopolis, it seems to me, is a hardware concept of the nineteenth century. I don't see anything twentieth century about megalopolis. I don't see how it has any relationship to instant information and instant environments of information.

*Others searched around for alternatives, as did **Peter Ind**:*

We do not have to accept the inevitability of megalopolis. Dr. Nash uses the word "inevitable" to describe megalopolis. If he is right, that removes a tremendous number of available options. It seems to me that if it is inevitable, then megalopolis is some sort of a natural phenomenon, either of the universe or of man; and I question whether that is the case. Surely there is a myriad of options available to us.

In response to Mr. Psomopoulos to name alternative patterns I have in mind, I could propose a number of alternative scenarios, but I don't think I could do it in the time available. Alvin Toffler has in his recent book, "The Ecospasm Report", put forward a scenario of possible depression . . .

Dr. Havlick also sought an alternative:

How do the megalopolitan analyses cope with the possibility of a stabilizing economic base, the steady-state economy in a post-industrialized era?

Herbert Strawbridge and **Alexander B. Leman** respond:

Strawbridge: We recognize that our economic base is now stable or is diminishing. We have worked out a programme of studies of the real economic system in the Northern Ohio Urban System (NOUS), in order to understand what the future really portends. There is valid reason to think that the steel base of the economy in the Detroit-Cleveland-Pittsburgh region is diminishing; that the automobile industry has its problems. We don't know yet what this really means on a long-term scale for our urban system, but a program of economic studies will tell us a great deal.

Leman: What we foresee is the inevitability of continuing patterns of behavior of human beings who will continue to seek these concentrations of opportunities and excitement that the megalopolitan system offers, regardless of technology or economics. Megalopolitan systems are emerging in undeveloped nations also, regardless of their chronic shortage of energy and a weak economic base. This is one factor. The other is that Gottmann has frequently and brilliantly discussed the development of the quaternary functions within the megalopolitan systems and large urban networks, the quaternary functions which even here in Toronto are beginning to replace some of the existing central city functions. There is a continuing change of economic activity within most urban systems; you will find when you look back, that every phase of evolution of human settlements could be explained as a reallocation of job opportunities, or work opportunities: from a nomadic culture, to a village culture, to megalopolitan culture today. We will be doing different work; we will be producing fewer things, machines will produce more, man will be engaged in managing his affairs, which is going to be an increasingly difficult thing to do, and this is why it will require more people to do it.

Not a Valid Concept

*The most severe questioning of both the concept and its validity, came in the paper presented by Professor **Hans Blumenfeld**, who takes the position that "megalopolis" is really a mere "metropolitan region" — certainly not a phenomenon different than metropolis:*

My skepticism is on three levels, where I doubt and question the validity of the assumptions. By validity I mean a significant correspondence between the model and the real world. On the largest level, I question the ekistic scale. On the most significant and intermediate level, I question the concept of megalopolis. On the most immediate level, I question whether the Great Lakes Megalopolis is a significant unit of settlement.

While a lot of things in the real world are governed or can be explained in mathematical terms, this is not true for all of them. The ekistic scale, which is a progression of the number seven, or seven to the second power, does not seem to me to really denote the point at which quantity has changed in quality, nor the point at which there is a real quantum jump, and where the settlements acquire substantially different new qualities. There is such a qualitative change from the big city to what we call for lack of a better name, the metropolis. These qualitative differences have been quite widely discussed by many observers, including myself, and I think that it is significant to note that metropolis is not just a larger big city. The metropolis is evidently a phenomenon which can really be identified only in this century, and which was born out of a transformation of the big city. What seems to me more significant is that there is a dual character in the use of the term metropolis which I would define as an inner metropolitan area and a larger metropolitan region.

The metropolitan area is clearly defined as a commuting watershed or as a common labour market and common housing market. There are also some quantitative limits; I doubt that it can ever grow beyond 25 million and the lower limit is probably not lower than half a million. But the quantity is not the most decisive part. Beyond the metropolitan area there is a much wider region — probably in the travelling distance up to two miles door to door by the most common means of transportation, — which is not really a commuting area but which is radically different from what it would be if the metropolis were not in its centre; Gottmann, in his classical, pioneering work, has been describing and pinning down these characteristics of the outer region.

The boundary between the central metropolitan area and the surrounding region will become more blurred for several reasons: First, because more and more potential destinations develop on the fringe of the metropolitan area which thus become destinations for a substantial part of the region for which the centre and the core metropolis is not a destination. This movement of course blurs the boundary. Another reason is that in a four day work week, the proliferating second residences, which are only on the outer part of the region, tend to become first residences and may proliferate much more than they do now. I find this course of action disturbing, because it seems to me to result in an enormous amount of automobile movement.

The Megalopolis Concept

Today, the attention has been focussed on the concept of megalopolis. In its most general definition, i.e. simply as a cluster of metropolitan regions as Gottmann has defined it, megalopolis does exist of course, and it has also

a generally linear form. But the linear form of existence of metropolitan regions close to each other is simply a newer form of what has existed since cities have existed. There have always been specific areas, particularly large river valleys, fall lines, and coastlines, which have attracted urban development; and what is happening is simply that these urban chains or clusters of cities have now grown into metropolitan regions which overlap each other. But is there a qualitative difference?

Are there features to be found in the megalopolis which are not to be found either in the metropolitan regions which constitute the megalopolis or in the larger, national or supranational urban systems of which the megalopolis forms a constituent part? This is, I think, the question which should be asked; and there are some possible tests to be made of megalopolis, in order that the question be answered.

First, if it is a significant unit of settlement, this means that the interactions within the boundaries of this area must be significantly more intense than the interaction between the area, and areas outside. I would accept that as a general definition of any region, small or large. Moreover, there should exist institutions within a megalopolis which are not to be found in those metropolitan areas which do not constitute a part of a megalopolis.

Listening to the clear and concise characteristics offered by Gottmann in his introductory speech, it seems to me that all of them except the purely geographical ones of a linear cluster separated by less populated areas from other such clusters — all those which refer to the quality of a megalopolis, refer just as intensely to any metropolitan area whether it is within a megalopolis or not. Certainly mass, density, and plurality are characteristic of any metropolis, as is the concentration and importance of the quaternary function, (including the function of quaternary relations with other nations or continents). In fact, it would seem to me that metropolitan areas which do not form part of a megalopolis, such as Denver, Vancouver, Vienna, Rome, exhibit these characteristics to a greater extent than many of those which form part of a megalopolis constellation such as Dortmund, or Lille, or Cleveland or Hamilton. So I have some difficulty in accepting the megalopolis as a significant intermediate form of human settlement between the metropolis or metropolitan region and the urban region of continental scale. The totality of these regions of course constitute the ecumene; and while I think it is not inevitable, it is certainly probable and to be hoped for, that the interaction and solidarity between the various parts of the ecumene might grow to the extent that we could call it an ecumenopolis, a world city.

These, then, are my doubts. In order to test one of the alleged characteristics of megalopolis, i.e. interaction, I was lucky enough to obtain the original data of the study of telephone interchanges, from which the impressive

graphs contained in Professor Gottmann's work were prepared. I tried to make a test by comparing the interchanges between five big cities of the northeast megalopolis with cities both within it and outside of it. From those outside the megalopolis, I was able to derive, at least to my own satisfaction, a kind of "normal" interchange which is of course growing with population and decreasing with distance. I then compared the actual interchanges as observed within the megalopolis, with the "normal" or "expected" interchanges, and I didn't find that they were any greater. I found no proof that the fact of being in the same megalopolis increased interchange. Absolute volume of interchange is of course much greater because there are great units located closer together than in the case with most of those on the outside; but not all of those outside. If we talk of the Great Lakes Megalopolis, there is certainly much more interchange between Montreal and New York than there is between Montreal and Chicago, which are supposed to be in the same megalopolis.

Therefore, neither from the point of view of greater interchange, nor from the point of view of specific characteristics to be found only within a megalopolis and not in metropolitan areas, have I been able to identify the megalopolis as a particularly meaningful step between the metropolis and the urban region; nor have I been able to identify the significance of the conurbation, which also has a place on the ekistic scale.

The Great Lakes

As to this particular area, it seems to me that it is not particularly more integrated in itself — not more connected between Quebec and Milwaukee to take the extremes, than with many other urban areas within North America. The St. Lawrence River and the Great Lakes form a main part of the watershed; but they do not constitute the entire watershed, because the Great Lakes areas in the north are not really part of the urban region, and there are several relatively small parts which are simply not a part of this watershed. Within the watershed, there is of course, a very close interaction between man and nature; but as far as the air is concerned, the limits of the megalopolis have no significance whatever.

Networks

I will now turn to consider the man-made networks, for the interchange of power, of messages, of persons and of goods. We have of course in the area of the supposed GLM, a wide reaching power grid and even the inhabitants of the city of New York know to their sorrow that disturbances in Ontario may affect them, as much or more than they affect — other people within this megalopolis. This is to be expected. The one thing that allows us to

define any area as megalopolitan is that there are natural barriers (in this case the Shield to the North and the Appalachian Range to the South) which separate megalopolises from other urbanized areas, but which do not present an obstacle to power lines, nor to electric or electronic communications.

It is goods transportation which is of significant interest. The area is a passway for heavy movement on land, and the waterway is suitable for movement on water. As far as air is concerned, there is again no obstacle presented by the land formation and there is no specific concentration within this corridor or this megalopolis. What is generally characteristic of air transportation more than of any other form, is that it is a point to point movement and frequent flights occur only between major metropolitan concentrations, from which the surrounding area is served in a concentric or an eccentric way. So it is definitely not linear, but rather point oriented. We do hope that a good deal of the air transportation for distances of up to 300 miles, (even up to distances of 500 and 600 miles) can and will be replaced by some super-fast ground transportation. If and when this comes about, it is fairly safe to predict that such trains also will not stop at small towns on their lines. Even the present Turbo and the Rapido between Toronto and Montreal do not stop at Kingston; it just does not pay to stop for a small load. So here also, the technological development goes in the direction of favoring the point to point movement between the major concentrations.

Again in freight transportation, the trend is to use only large ports, rather than small ones. Because they are big, they can accommodate big ships and big and expensive loading and unloading facilities. The movement is again point to point between the major ports. (Actually, one of the great weaknesses in this system is that there are too many harbours. It is a definite handicap to the efficiency of the shipping on the Great Lakes, that there are so many important harbours, rather than two or three even bigger ones than those in existence now.)

The interesting recent development in freight transportation is that, according to the Canadian Transportation Commission, it is now cheaper and more economical to carry a ton of freight from Halifax to Montreal in a unit train rather than by water. If this is true — and of course railroad accounting is a mystery wrapped in an enigma — this would be an astonishing reversal of a millennial relation. Unit trains for bulk goods and for containers are a point to point system between major concentrations, serving no spot in between.

Therefore, while the predominance of the motor vehicle has favoured linear development, the emergent trends point to a stronger point to point relation. What happens from this point on? Interaction with widely dispersed

points will of course be necessary; and we will still rely almost completely for goods (although not necessarily for persons) transportation, on the motor vehicle. This means that we will have, as we have now, hundreds of thousands of fast moving, hard bodies under individual control, implying an enormous danger of collision, which in turn will tend to impose limits on speed. It is foolish to allow speeds of more than 70 miles an hour; we probably should cut down on speed, which again limits the radius which can be served from the great concentrations.

To sum up, I foresee a further development of metropolitan regions, each concentrated on its separate centre, rather than constituting a part of any linear development which would justify the name of megalopolis.

There will of course be a lot of problems to be solved between neighbouring areas as well as neighbouring non-metropolitan areas. Certainly, everything on the globe is connected with everything else. But I am not convinced that the megalopolis is a particularly suitable unit for research, for planning, or for management.

Not in Canada

Professor Maurice Yeates is quite specific and firm in not accepting the existence of the megalopolitan phenomenon, especially in Canada:

Though ekistics is concerned with "man's patterns of living and their physical expression in the past, present and future", I cannot accept the planning visions that result, for they seem to involve some kind of "design-mysticism" which is beyond my comprehension. My study of urban trends in the Windsor-Quebec City axis is not concerned with establishing the area as part of some developing Great Lakes Megalopolis because I do not know what use it would be to make such a discovery.

The urban axis between Windsor and Quebec City, though extensive, is not of the same magnitude or density as other linear agglomerations. There are a number of extensive linear agglomerations in the world, and most of these have been detailed by Gottmann concerning the global development of megalopolitan areas. The size and crude density characteristics of three of these, along with the axis, are listed in Table 1. The Windsor-Quebec City axis has nowhere near the same linear density as the intensive urban developments between Boston and Washington, Tokyo and Osaka, and London and Manchester. While these three major agglomerations have about 100,000 persons per linear mile, the axis area has a linear density of less than one-fifth of this. Thus, the special problems and remedies, touted for these major urban agglomerations, should not be transferred automatically to the axis area.

Table 1 The axis compared with other elongated urban agglomerations

Agglomeration	Length (miles)	Estimated population (millions)	Population per linear mile
Windsor to Quebec City	715	12	16,780
Boston to Washington	450	45	100,000
Tokyo to Osaka	370	35	94,590
London to Manchester	200	20	100,000

Source: CTCRB (1970), p. 1.

Megalopolis is a Fact

To these questions and doubts, Dr. Peter Nash, Professor John Papaioannou, Professor Earl Murphy, Alexander B. Leman, and Professor Jean Gottmann reply:

Nash: Megalopolis is not a prophecy; it's a fact. We will have megalopolises whether we like them or not. Every piece of evidence points in that direction. The question is not whether it will come, but how we will welcome it. Will we be prepared for it when it comes? We also know to some extent when it will come; to me, although maybe not to others in this room, that question is no longer up for discussion. I'm already thinking about the next step: how can we prepare for it so it will be better, so that it will make life freer.

Papaioannou: I will simply reinforce the statement made by Dean Nash, that pieces of evidence which we have for the Great Lakes Megalopolis, or other megalopolises on this continent, or megalopolises in many other parts of the world — show how strongly this phenomenon is emerging; and there is nothing to show that the emergence will stop. Not only are megalopolises inevitable, but they are here; we have them in great profusion around the world, and they are growing forcefully and are developing into more complex organisms all the time. I feel that our responsibility, is that of being prepared to guide it, because there is a considerable latitude in guiding it. Until today, no megalopolis in the world has been planned by anyone, and that is why it manifests so many disadvantages.

It is also clear that there could be a number of different models of megalopolises; whether we are going to have one or the other kind is to a large extent in our hands. There are surely some catastrophic types if no control at all is exercised, as there are surely some beneficial types. We can

predict systems of megalopolises which will serve man better than anything we have today; it is entirely within our power to plan for these. In fact, not having planned for any of the 45 megalopolises around the world, I think that we should be very grateful that they are not even worse than we find them to be.

Let me offer a simple example. While in Toronto, I flew in a low flying plane over the surrounding area, and I saw that there was a continuous band — a horrible band I must say — of built-up area which extends not only from Toronto to Hamilton, but to Oshawa and Newcastle. It extends north towards Lake Simcoe and it extends, as an entirely built-up area, from Hamilton about two thirds of the way towards St. Catharines. I saw it with my own eyes and the fact that it is built-up is surely not a beautiful scene. It has happened here and it has happened only in recent years; but if one had realized what megalopolis means and what one can do with a megalopolis, it would have been relatively easy 10 or 15 years ago to prevent this kind of condition.

Leman: Professor Blumenfeld takes the position that megalopolis is nothing more than a “metropolitan region” and in response to a question, he indicates that no metropolis is different because it is within a megalopolis.

I think that the Toronto Metropolis is in fact a good example which points out the very opposite: the metropolis which is a special case because it is within a megalopolis. I will point out the confusion which arises when existence of the megalopolis and the forces within it are ignored.

Ontario developed a concept of the Toronto-Centred Region, from which emerged a policy of directing urban growth to the east of Toronto. As it is generally known, this policy proved to be, if not an outright failure, then at least an expensive and a difficult policy to implement. I think that a big reason for that is that the “Region” is neither Toronto-centred nor symmetrical as the term would imply for a metropolis on the shores of a lake. Conversely, the megalopolitan forces to the west are much stronger at this time; the forces which would enhance the growth to the east are not there yet and when they become evident, they will first stimulate growth somewhere in the confluence zone at midpoint and not in Oshawa or Pickering.

Murphy: What’s in a name? If a name does not adequately represent the form and the function of what is named, then the name perishes and it becomes a neologism that, after a season, disappears. Names are therefore important. It seems to me that the function and form of megalopolis exist, and that that form and function are different than the form and function of metropolis, because of the interrelationships within the system, that act to intensify growth between and among the major nodes; that act to intensify

confluence points; and act to intensify the abstract transactional flows, which Jean Gottmann has mentioned, but which have not yet been discussed extensively at this meeting — those flows of orders, credit transactions and legal relationships that bind together the units in megalopolis and which are rarely shown upon any physical planner’s map.

Papaioannou: When we speak of Great Lakes Megalopolis, we mean not one isolated megalopolis, but a system of interconnected megalopolises; or a complex or a network of megalopolises; and probably in the future, a “grid” of megalopolises in the Great Lakes area. Interpreting which megalopolis is which may even have no absolute meaning; for example, there is one megalopolis from Chicago to Detroit to Cleveland, and another branch from Detroit to Toronto. But one can very well say that there is one megalopolis starting from Chicago, Detroit, Toronto, and another branch going down from Toronto to Cleveland and Pittsburgh. When we speak of the “Great Lakes Megalopolis”, therefore, we must realize that this is already a system of interconnected megalopolises.

Gottmann: Twenty years ago, the patterns of urbanization along the Great Lakes did not yet seem to be truly comparable in density and functions with the Northeastern Seaboard Megalopolis. A vast chain of metropolitan regions was forming there especially on the American side of the Great Lakes, but with a looser structure and a specialization in manufacturing production rather than in quaternary activities. Now a rapid evolution has taken place, modifying the picture; and I am much inclined, even in my strict interpretation of the megalopolitan concept, to recognize its rise here. The Canadian sector of the Great Lakes Megalopolis is probably, in the present circumstances, the most megalopolitan indeed by its rapid development of transactional activities, and by its national and international role as a hinge and as an incubator.

Whatever it is — deal with it . . .

Disagreements and differing views are the necessary components of the search for truth. Confusion thrives when rapid and profound changes befall the uninformed, as shown in the exchange that follows:

An observer from the audience: I am glad that this meeting is open to the public so that the public can respond. I had a bit of a problem with some speakers. I really did not understand what they were saying and I’m trying to give them a little bit of feedback. I found the discussion far too intellectual and abstract. I am sure that what you said is quite valid; but what on earth are you talking about?

Mead: We are talking about something that is happening in the world, something that is of the same magnitude as when the first city was invented and mankind found a way to keep people for more than a couple of weeks in one place in large numbers. I think it may be best for the new listener to this discussion, to throw himself back to the time when nobody could feed a large group of people for more than two weeks so that they could come for the Greek games or for a religious ceremony. They all had to go home again within a few days because they could not keep any food there. But then mankind invented a way of storing the food; and we invented script; and we invented kinds of government that made it possible to build cities; and what we are talking about is another transformation of the same order.

Perceptions of a complex phenomenon vary from person to person. However important a common understanding might be, unanimity is nevertheless seldom easy to attain; and yet debate and deliberation of certain aspects of the problem, to be useful, must eventually lead to a consensus, if action is to occur. Dr. Margaret Mead brings this point home, forcefully:

We have the analysis of megalopolis; we have sets that we find can be comparable from one large area to another. We do not have as many comparable areas as we might have but we have got the Northeast United States study, the Detroit study, the GLM-Canada study and the Japanese studies. We've got enough to think comparably, with sets laid out in a way that we can deal with them.

Now, most of the time, people waste their energies arguing about the dimensions of some sort of change. In population, they're arguing as to whether the population in the year 2000 will be seven billion nine hundred thousand, or six billion nine hundred thousand, plus or minus something or other; in the field of climate they're arguing as to whether we're going to have another ice age in 50 or 500 years. And one of the things they've succeeded in doing, therefore, is doing nothing, because the experts spend all their time arguing with each other instead of getting anywhere.

Is megalopolis inevitable? You can spend your life on that question, arguing about the year 2000, when we probably won't be here if we keep on with this kind of argument. In the field of climate, we've come to a rather reasonable position, between the people who think the next ice age will arrive in 50 years, and the ones who think it will arrive in 500 years; and that is, that nobody can dispute the fact that we're losing a portion of our arable land in the northern hemisphere every year.

So you agree on your minimal points and get on with the job!

1.3 Perceptions of Megalopolis

What, then, are the perceptions people have of megalopolis, of the life within it, of their future because of it; do people have any perceptions of it whatever, and how important is it that they do; who are the people that have a particular responsibility to perceive it and why?

Dr. Peter Nash addresses this problem:

Some years ago, when I reviewed Jean Gottmann's book "Megalopolis", I commented that we must move toward a common market in the allocation of megalopolitan land. Specifically, I said: "We must move toward a common market in the allocation of megalopolitan land, that is: a situation in which an industry, a shopping centre, and most important of all, a family of whatever size, income, or origin, can locate freely within megalopolis, without concern for municipal boundaries that have become technologically and socially meaningless." In the GLM we can even cross out the word "municipal", and just say that any sort of boundaries become meaningless.

How can one discuss this "common market", especially as a positive concept, without really getting bogged down in detail? I think that I could relate this to some of my writings on icons and iconophobia, the fear of images. Icons also include values, beliefs, symbols, attitudes and so on. We have strong feelings about these; and we have heard a lot of icons discussed here. There is a fear of images, of words, of catchy slogans. This fear antedates the second commandment prohibiting the creating of graven images, and iconophobia is frequently the rejection by an unsettled society of the images of established society.

The concepts of metropolis, megalopolis, and ecumenopolis, cause negative images in the minds of some. The basic problem then is: How can we enhance the desire to know more about the problems of urban settlements via some positive icons, which imply freedom — the freedom to move not only physically, but economically, socially and culturally. When we think about megalopolis, we're thinking about moving — not from one stage of civilization to another, (which is what Jean Gottmann stated in his first writings) but to an even more significant stage, demonstrated in John Papaioannou's and Doxiadis' excellent book "Ecumenopolis"², where they point out that we are now in transition from a period of civilization to a period of ecumenization. I believe that it is this positive icon of the "common market", of thinking about megalopolises such as the GLM, that will make all of us realize that this critical transition implies a process of loosening, of freeing, or in German "Auflockerung" — a diminishing of old and accepted barriers, not only to provide megalopolitan freedom of various modes, but also to make possible its comprehensive integration. Without this

positive icon, megalopolis cannot really find its way from Ekistic Unit 12 to 13. This transition from a period of civilization to ecumenization is a substantive, new step that we have to think about, and which has to be explained. We must make clear what we mean by some of these concepts. Even last night, during John Papaioannou's excellent TV interview, at the end the commentator picked up a few icons, and said "Oh, we learned a few words today. We learned "megalopolis" and "ecumenopolis", we learned "ekistics" — as we recently learned "celsius"."

Now I want to take one icon, the common market, and show that it is something that can be treated ekistically. Let's look first, at Nature. Water in the GLM does not, in any way, respect any kind of boundaries, even international ones. It just flows merrily downhill, unstoppable and irreversible. We have created for water artificial dams and canals and similarly we have provided dams for megalopolis, but in the long run, the overall pattern of drainage cannot be ignored; nor can it be disregarded for megalopolis.

Climate and air masses follow a course which can only be slightly manipulated by human beings. But the content can be seriously polluted. The pollution of Detroit extends over a hundred mile radius; air pollution in one area ultimately affects the atmosphere in other areas and only large scale, comprehensive controls can be effective.

A map indicating the extent of land areas occupied by Indian tribes before the arrival of the Europeans, showed that the area occupied by the Iroquois coincided with the extent of the Great Lakes Megalopolis-Canada, from Detroit to Quebec City. Of course, this has been attributed to the particularly favourable climate of the region, and the high fertility of the soil. We think of the animal life, we think of the rural land in the Niagara peninsula, the rapid urbanization of the orchard areas. Comprehensive common market laws are needed to stop the rapid disappearance of valuable agricultural land in the GLM.

What about Man? Considering only some of the key icons without going into them elaborately, we think of individual freedom, freedom of movement; of having a panorama of choices and lifestyles; privacy vs. maximum accessibility to yield a great variety and mixture of all types of human groups; and pockets of solitude, not only in the remote areas of the Great Lakes Megalopolis, but within the core areas themselves.

Society functions at its best where a minimum of controls allows groups of people to develop according to their own traditions and lifestyles, such as in the case of the Mennonites in Waterloo County. Through the elimination of ghettos, one must be allowed to move in and out of settlements,

without undue hardship. As indicated, municipal boundaries have become technologically and socially meaningless and are unduly restrictive by antiquated methods of taxation.

Shells (buildings) must be carefully designed so that structures and facilities preserve the existing "natural" areas, avoiding continuous megalopolitan development throughout the GLM area. The layman believes that as soon as we speak of megalopolis, there is a continuous strip, or sprawl; but it need not be continuous. On the contrary, we have to see to it that it is not continuous, while we also ensure that the identity of small groups is retained, via deliberate focal points at the human scale.

With reference to Networks, it is expected that there will be a rapid and efficient mass transportation system to ensure reliable movement between all sectors of the megalopolis, as well as computer and communication networks to link the major focal points of the GLM with each other, for research, commerce, education, and even in the more distant future, for personal communication. Communications networks tend to reinforce the GLM "belongingness" — this new order of things, new "territorial identity" — in addition to reinforcing other allegiances such as nations, states, provinces, regional municipalities, and villages. Broad development of GLM media for the totality of the area (i.e. newspapers, television etc.) should also reinforce the megalopolis "icon" through the description of ongoing GLM activities.

Synthesis

The development of this new concept of "megalopolis", which people will accept gradually as another unit to which they owe allegiance, is an inevitable new stage in urbanization. It is a stage in the process of ecumenization, and it must somehow be embraced during the decades to come. People will begin to realize that this inevitable phenomenon, which is becoming more visual and is more clearly perceived with each passing decade, must be and can be controlled and guided, rather than curbed or muzzled, because it can offer great potentialities, and promises opportunities of new dimensions, heretofore not encountered in human history.

The "common market" concept might be used as one of many icons to accentuate the positive, to sublimate the iconophobia that is shared by individuals and officials to whom the highly populated urban area of the future is a sinister threat rather than a challenge. The common market concept is an opportunity for cooperation, not only among nations, as it is already used, but obviously among the various ekistic levels as well.

Effects of Ideology

Perceptions of the same phenomenon differ not only with the change of cultural setting, but also with the ideological bias within which the phenomenon is viewed. Professor Eiichi Isomura, who visited the People's Republic of China in the months preceding the Symposium, sums up some of the perceptions from Asia.

In Japan, when we talk about the megalopolis, reaction from the political left wing groups is that megalopolis implies either a domination by the larger metropolis, or exploitation by the rising metropolis.

During my trip from Shanghai to Peking, I met several professors and discussed their urban problems. I found that they have the same reaction as political left wing groups in Japan.

When I called Shanghai-Nanking a megalopolis, they quickly declared: No, no, this is no megalopolis!" Politically, ideologically, they do not accept the concept of megalopolis; yet their people continue to have their own reasons for going there; almost 11 million people now live in and around Shanghai alone and of course, many more live in Nanking.

When I explained that megalopolis is not the central area of study of human settlements, but that our study ranges from man to ecumenopolis, the response from Chinese groups was: "You say 'man to megalopolis', but in China, people are much more important than man. What is your understanding of the differences between 'man' and 'people'?" What could I say to that, except that theirs was one important example of the differences that exist between two ideologies.

The Chinese were anxious also to point out that they continue to maintain the autonomy of the commune, based on the principles of self-reliance. Three principles exist. The first principle is to use natural resources within the commune, so that even the water supply, the energy supply or the food supply must remain within the territory of the particular commune. The second principle is to develop industry again within the territory. For example, although before the war or before the revolution, the Shanghai area alone was the most famous area for the textile industry, now they have partially removed the textile industry to Peking; the moral being that even Peking, as the capital of China, must support a textile industry, to ensure its own autonomy. The final principle states that the people must consume within the city, within their territories. These three principles help to ensure the autonomy of the commune, the autonomy of the urban society.

Transportation and communications are quite a contrast to my country. Throughout my three weeks in China, I never saw cargo or truck transportation, but only the commuting by the people . . .

What is the impact of such different perceptions and of different ideological biases, upon the megalopolis? Professor Earl Murphy and John Papaioannou comment:

Murphy: Would the socialization of credit, of land and of production prevent megalopolitan development? The answer to that is it would affect it, yes! It would delay it; perhaps it would give it a particular form. The sort of megalopolis which Professor Isomura says exists around Shanghai-Nanking must be a different kind of megalopolis than ours, but on one basis only: he talks of the autonomy of the commune, which attempts to be self sufficient as to energy, as to production and as to the disposal of consumption and which therefore confines movement to the movement of commuter population, as opposed to what Jean Gottmann was talking about, where our megalopolis emphasizes movement of goods and messages.

But prevent the development of megalopolis, no. Megalopolis in socialist states may be far more concentrated, may be less subject to residential sprawl, may be less subject to environmental fallout, if the government makes the decision not to have environmental fallout. But it will exist, and it does exist. Why? because everywhere in the world, whether we are state capitalist or private capitalist, or organized in a communal form, we are a high-energy culture, dependent on energy cascades that are coming in a form that is resulting in the spread of urban growth, because it is drawing populations into megalopolis and it is acting increasingly to impose urban forms upon the land.

Papaioannou: Many people ask about how megalopolis is influenced by political systems. It is influenced because political systems— like the sun — may cast a different shade on the megalopolises that are there, whether near the equator, or near the poles, whether in less or more developed countries, whether in Maoist China, in Soviet Russia, the western world or any other political system. According to conditions in which they are born, we find differences in the typology of megalopolises. For example, megalopolises in North America are the most highly developed — also the ones with highest incomes; they are the ones with the lowest densities — densities are from 2 to 3 persons per hectare, whereas in Europe, the highest densities are between 8 and 12 per hectare. The Japanese figures are close to the European ones, at about 9 persons per hectare. But from the point of view of internal organization, there are of course, many great differences between these megalopolises,

Precisely as Jean Gottmann has said, we have nowhere found any kind of decay or retreat of the megalopolitan phenomenon. Megalopolises are there, and they continue to grow. Of course, growth rates can diminish; an older megalopolis grows at a somewhat slower pace than a new one. But the curve depicting growth rates seems to go towards an asymptotic value, so that

residual growth will be there to represent the growth of these megalopolises, in the near future at least.

Megalopolises and Community

Does the perception of megalopolis, depend on it being considered as a "community" and if so, is megalopolis thought of as a large community within and from which one is? Is such perception by the many publics a prerequisite for its existence? Professor H.S. Coblenz presents his views on this issue:

Narrow and limited views are not always negative but in an expanding urban society such as ours, respect for neighbourhood and community can also breed contempt, disdain and at times ill feeling for larger domains which can prevent conceptualization of future urban forms being realized.

Megalopolis presents definitional problems to those who think or perceive in terms of "here". Differences between the attributes of "here" and "there" have always been of great interest to human geographers because it is precisely the differences between places that generate movements of goods, people and information.

To analyze such complex patterns produced by humankind on the surface of the earth, geographers are increasingly looking at questions of relative location, questions which consider places not in any absolute, old fashioned, latitude and longitude sense, but in terms of their costs and times to all other places with which they might exchange goods, money, people, and messages. The fact that we cannot satisfy all our demands in one place is the root cause of these gigantic and varied patterns of exchange. The geographers identify these patterns as spatial interaction.

The phenomena of migration for work, pleasure or survival in North America, western Europe or the subcontinent of India are providing new concerns for the geographer and planner. But also of great importance is the way in which people form images of their places and how these images influence the decisions people make, including the one to move. A positive image may reduce the effect of distances as one will travel further to visit a good friend than a more casual acquaintance. In these situations, the idea of social proximity and physical distance interact to produce a particular response, be it a journey, a letter or a phone call. How does such "distance perception" help in understanding or appreciating the idea of megalopolis?

Social anthropologist Clifford Geertz defines a distinction between what have been called "experience-near" and "experience-distant" concepts. as follows:

An experience — near concept is roughly one which an individual might himself use naturally and effortlessly to define what he or his fellows

see, feel, think, imagine and so on, and which he would readily understand when similarly applied by others. An experience — distant concept is one which various types of specialists — an experimenter, an ethnographer — employ to forward their scientific, philosophical or practical aims. 'Love' is an experience — near concept; 'social stratification' and for most people even religion are experience-distant but caste is experience-near at least for Hindus and Buddhists.³

Putting matters this way in terms of how anthropological analysis is to be conducted and its results framed rather than what psychic condition anthropologists need to have, reduces the mystery of what "seeing things from the natives' point of view" means.

Gottmann suggests (in 1961) that it may be too early to speak of a megalopolitan community. From time to time we may think of ourselves as national or international citizens because we believe we are the hub — the centre of the universe — a perception based on somewhat limited perceptions of the whole. In fact we operate at various levels with little understanding of the processes which are most ably expressed by the megalopolitan concept.

The Megalopolis of the Great Lakes is a system, however ill-defined. People move to large central areas despite an uneasiness by many to do so; in fact, they often have a real desire to stay within their own local domes of desirability. Each time we nurture a community sense of belonging, we enhance this "local" attitude.

The operational aspect of a vast system, i.e. megalopolis, provides the conceptual framework with which to lay out priorities and express desires so a conflict does not have to exist. Regional government in Ontario may not be welcomed by the various publics but it is causing people to rethink their role in a complex society of which local government is only one element. It is only just now that we have sufficient governmental organizational changes to allow trade-off matrices to be prepared, e.g. a locally hired and known constable in a small town as opposed to a stranger in uniform of a regional municipality police force, operating from a central location.

If however, the public feels less comfortable with the new organization, are we destroying a previously held perception about the "value of the local police force"; not a service value change but an imagery change which is destructive because it tends to obscure other changes which may be positive in perceptual and real terms?

I would suggest that for the analyst megalopolis is real, substantial and provides a future oriented basis for decision making, but for the many publics, it is at times a red-herring, dysfunctional and an anathema to their

sense of belonging or wanting to belong, southern Ontario is made up of newcomers who want to identify with something not necessarily an ethnic group either. Governmental reorganization is most generally not a desirable solution to accomplish this and a great deal of longitudinal monitoring must be done before the drastic step of a reorganization of government reflecting megalopolis, is taken. I am not suggesting this is contemplated but on the positive side probably more than in any other period of history, people are responsive at all levels to the public and private sector on a year-round basis other than solely at election times; e.g. issues of ecology, consumerism, civil rights, etc. We can well afford the luxury of stable government organization for the next 10 to 20 years. After all, it is barely 20 years ago since the Municipality of Metropolitan Toronto was created. In the language of those concerned with paradigms, design process, etc. — these will survive and be reformulated — the political structures are in a constant state of transformation because of the players and the function of time.

Conclusion

The ability to comprehend megalopolis may well be a perceptual problem of a number of the publics, but for the planner it is a responsibility to deal with and identify its role.

I propose that megalopolis is not a threat to existent municipal councils by imposing further “guidance tools” from Queen’s Park. Megalopolis presents the opportunity to identify the issues within a megalopolitan framework — the solutions are only as good as the intellectual prowess guiding the policy makers. If we think in governmental reorganizational terms, we limit our treatment of the futures.

Is perception of the “community” a prerequisite to development of its system of governance? Spenser Havlick thinks so.

The validity of governance of megalopolis will only become a reality when the individual, regardless of age, race, social station, or various political allegiances, assumes a megalopolitan conscience. At a time when passengers on spaceship earth are both expanding their vision to ecumenopolis and also refining their skills of introspection and personal life styles, it may be somewhat premature to attempt a development of citizen involvement with megalopolis. At the moment, megalopolis is a vacuum in terms of active citizen involvement. Only through new forms of citizen preparedness will that vacancy be filled in an equitable, humane way.

George Peter points out a different “real world” experience:

I might be misinterpreting Professor Havlick, but I believe he said that before we can begin to govern megalopolis, the community, the people in it,

must perceive that it exists. If you look up on the wall above you, you will see that in 1953, the corporation of Metropolitan Toronto came into existence. In the more than 20-year period since that time, this government has provided a great range of services within its boundaries and the extent of those services and the number of services has continually expanded. Working for that corporation, I am continually amazed at the numbers of citizens who don’t know it exists and even the elected officials in various parts of it also don’t know that it exists or what it does. My conclusion from this is that the provision of the services that are needed to make the megalopolis grow in a more healthy way can precede the perception of it by its communities and in view of the urgency of the problems that we are going to have over the next 30 years, I do not think that we should wait until the full community perceives it, but we should get on with the job and inform them as best we can.

1.4 Is “Megalopolis” Useful for Planning?

Professor Maurice Yeates raises the question of whether the concept of megalopolis is a helpful one in planning for the future. He concludes that it is not and then reinforces his view:

In Ontario, construction of the Queen Elizabeth Way from Toronto to Buffalo and the 401 from Windsor to the Quebec border have determined the direction of development flow more than any other factors. For planning purposes, it would be more useful to look at the total needs of the future — local governments, food, housing, livable areas, and other such factors, — than at concepts such as megalopolis.

Norman D. Lea feels quite strongly that the major determinant among different patterns of population distribution is the urban transportation cost:

If we tried to compare in some quantitative fashion, 10 different possible arrangements of population, we would find that one of the most significant variables between them is the urban transport cost. Many of the other things that we talk about find their quantification in terms of this urban transport cost.

Using uniform density of 6,000 people per square mile (4,000 per square kilometer), we found that a community restricted by walking, was restricted to a radius of 3 miles and 200,000 people. One restricted by the streetcar or motorbus with a line speed of 10 miles an hour was restricted to a radius of 6 miles and some 600,000 people. The automobile on the great streets took us up to 2½ million; subways with surface transit also make practically

2½ million; commuter trains put us a little farther to 3 million; autos on freeways at an even level of service, makes 6 million practical and at a high level of service; at an average speed of 50 miles an hour, they place 12 million into the horizon. This is the extent of our present level of technology. We can support 12 million people in one continuous urban development area. The practical limit that we find people are willing to travel, is something like 45 minutes.

Urban areas that go above this 12 million limit, either have some crowding with people living at higher densities than they would choose to live in, or they have some people travelling unreasonable distances in their work trips, or a combination of these.

The only way we would go beyond this constraint of 12 million people, at a desirable density, is with the “dual mode transit” or “automated highways”, with speeds of perhaps 70 or even 100 mph and vehicles under automatic control which would theoretically allow for the possibility of going up to some 25 or 50 million people in one continuous urban area, circular in form, providing this interchange of daily commuter travel.

How much transport can you buy with an hour's work? We find a surprising uniformity at the present time: an hour's work will buy 100 miles of bus or train travel; 80 miles by low quality transit; and 20 miles by high quality transit. For the auto, the range is wide, depending upon the standard: a large auto, with single occupancy can get 30 miles; a small auto with multiple occupancy, can get up to 300 miles for an hour's work.

In the future, it appears that we will be able to buy more transport distance for an hour's work. These distances have been increasing in the last 20 years, and I think they will continue to increase. The use of the auto, however, should increase more than transit, and our projections to 1990 show that an hour's work should buy about 50 miles for the large automobile with single occupancy, and about 500 miles for a small vehicle with multiple occupancy.

What all of this means to me is that I do not think that the cost is going to be a serious constraint in the development of transportation systems in North American cities.

As I see it, speed is the most serious physical constraint and I think it is going to be exceedingly difficult to overcome this constraint. In fact, it is going to be very difficult to make continuous urban areas much larger and supply a good transport system at an affordable price.

While the concept of megalopolis may therefore be useful in other fields, I have not been able to define its usefulness from the point of view of transport analysis.

Dr. Harlan Hatcher draws on his extensive experience during the last decade with the Great Lakes Megalopolis Research Project:

I thought that this afternoon, we were in danger of losing our perspective and being bogged down in some confusion that is quite unnecessary. When we did the Urban Detroit study one of the first things that emerged was that we could not deal in any effective and realistic way with the problems that were confronting us in Detroit, or even the Detroit Metropolis, unless we first understood the large external forces which were causing pressure and tension on our study subject. We began to be greatly concerned about the periphery of the area, and how quickly the problems of Detroit merged with those of Cleveland on the east and Chicago/Milwaukee/Erie/Indiana on the west. Whatever validity there was in the focus on Detroit, there was a broader impact on the Great Lakes Area. We had no preconceived notion of any great, sprawling megalopolitan area which was about to develop, but every city between Chicago, Detroit and on into the Canadian sector, indicated a constant increase in population and area. In the seventies, the areas got closer and closer, as they came together. It was obvious that there was absolutely no plan, purpose and no direction to this; it was random growth being pushed by whatever forces were at work at the moment.

We all are indebted to Dr. Gottmann's work on the eastern seaboard, as our preliminary studies showed clearly that if you take any single control set or any indicator of growth of the eastern megalopolis, you could duplicate it in the Great Lakes Area, with a time lag of approximately 15 years. This clearly meant that we have a 15-year margin at the outset to correct anything that may be corrected!

What we have here is a dynamic maturation of one of the most important areas on the face of the earth, that is already moving in a direction that we would prefer it not to go. If it is not guided, it will produce a much more untenable and unliveable region than we have any right to allow. Our purpose in the Megalopolitan Research Project (and the usefulness of the concept of megalopolis) is to give us a larger perspective of how to begin to think about a total region and how to begin to manage it with our present understandings and the new ones developing, so that in another 50 to 100 years (perhaps 150) it will be able to support the extra 20 million people with some degree of graciousness and relaxation rather than with the “wear and tear” that is destroying us at the present time.

Beatty: I think it is essential to hold out the positive aspects of urban growth as a natural resource. We are still part of nature; population growth is still a natural process, be it good or bad; and I think all we have done in structuring our societies has not been bad.

1.5 Megalopolis: A Step towards Ecumenization

The value and usefulness of megalopolis as a concept, can perhaps best be considered if one were to “change his lenses” and consider the phenomenon of megalopolis in the larger contexts of space and time. John Papaioannou provides such an opportunity as he explores and describes the megalopolitan development as a global phenomenon, which in the foreseeable future, will lead to the Universal City, Ecumenopolis.

I will begin with a definition of sizes of human settlement, as devised by C.A. Doxiadis, and as reflected in the Ekistic Logarithmic Scale (see Glossary), within which all settlements — existing or future — are classified in 15 steps, starting from the smallest, containing only one man, to the largest one containing the maximum population that the earth will ever be able to sustain.

I will consider only the higher steps, starting from the large city, with an average population of 300,000 people; the metropolis, with an average population of 2,000,000; the conurbation, with an average population of 14 million; the megalopolis having 100 million as an average population; the urbanized region containing a population of 600 million; the urbanized continent of 3.5 billion — and then ecumenopolis with approximately 20 billion people.

The megalopolis with a population of 100 million is much larger than any existing one, which shows that a fully developed megalopolis has not been reached in our times. According to this classification, megalopolis population ranges from 35 million to 250 million — so our difference with Professor Gottmann is not that great for what we call a true megalopolis. However, we have introduced a concept of “premegalopolis” in order to classify certain systems which are smaller than 35, but bigger than 10 million people and which already exhibit some of the characteristics of the megalopolis. If they are much smaller, then they exhibit these characteristics faintly, and as they approach the 35 million figure, they exhibit them more distinctly.

These seven categories of large settlements have a physical structure of their own. Most of the cities in the past had a sort of uniform configuration on the ground, and especially all the cities enclosed by walls had a uniform density distribution. We find that a modern metropolis having a core, which is more or less like such a city, extends into the surrounding region by a system of tentacles or other appendages, which give it a shape discontinuous to the region, with many open spaces in between and with a much lower density. The next step on the scale, combines several metropolises into a conurbation, as does for example, the Ruhr in Germany.

The Confluence Phenomenon

The following level of organization is an alignment of conurbations along a particular shape, where the surrounding regions begin to change because of the description of megalopolis; the same kind of axis, the same kind of boundary, the same kind of hierarchies inside the megalopolis. Therefore, it is not a product of one particular type of method used because all the methods used, led to the phenomenon which emerges here: megalopolis.

Ecumenopolis

At this point, we are already witnessing the next stage, even though it is still infrequent and incomplete: that is a coalescence of several megalopolises into a broader system, which we call the urbanized regions. The stage which may appear sometime in the latter part of the next century, would be a still more complex system of interconnected megalopolises, tending to form a grid. These may appear in various forms, and configurations, and there are already three or four such systems which have appeared in our times, the first one being precisely the Great Lakes Megalopolis; the second being the system in northwestern Europe; and the third one being the Japanese one, where already two megalopolises are meeting, according to this particular system of growth and development.

This kind of grouping at larger scales, seems to be something which develops with inescapable force. It gets into more complex systems until, at a certain time, one or two centuries from now, we can expect to have a situation reaching a global equilibrium which has been called Ecumenopolis, where all the habitable areas of the world will be inhabited and interconnected into one system.

Megalopolis

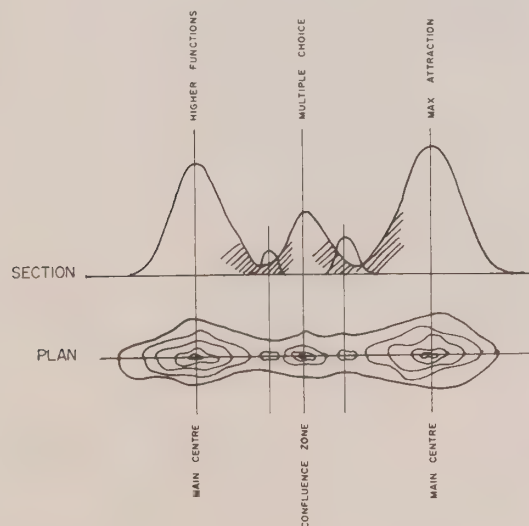
In returning to the scale which is of central interest to us, I am reminded that megalopolises have been blamed for quite a number of ills, such as excessive pollution; difficulties with the environment at every level; the great complexities leading to alienation of the people living in it; and difficulties with rural uses of land which, although still existent, diminish rapidly. Our study of the Great Lakes Megalopolis in the U.S.A., found that rural land was progressively being used for other non-rural, urban uses, and within distances up to 50, or 60 miles outside the edge of the built-up area, only 50 percent of the land was used for rural purposes. Similar difficulties due to the presence of these centres are apparent. When we reach this stage, we see the occurrence of one of the characteristic phenomena described by

Professor Brian Berry, the “confluence phenomenon”: a point approximately half-way between two main centres, is characterized by the fact that from this point one has a choice of equal access to the two adjoining centres. By being attracted by these two adjoining centres, compound influences exerted from the two centres on that particular in-between point are greater than elsewhere. It has therefore been found that these new centres usually grow more rapidly in such circumstances, and they appear as new growth centres within the megalopolis (Figure 1).

A graph-type section through a megalopolis shows that per capita incomes are higher, that immigration is more rapid, unemployment is lower, educational attainment is higher, and so on, which is also a case for the area of the megalopolis itself, with respect to the lands and people outside of this area. The confluence phenomenon is one of the significant characteristics in the structure of megalopolis and is a result of the interactions with two adjoining centres.

At the Athens Center of Ekistics, we have been studying the structure of megalopolises from quite varied points of view, and with various techniques. What is interesting to note is that all methods come to the same sort of

Figure 1 **Confluence Phenomenon**



Source: J. G. Papaioannou, *Megalopolis — The First Definition*, Athens Centre of Ekistics, Research Report no 2

conclusion regarding the disappearance of agricultural land which is evident here in the Canadian part of the GLM.

These disadvantages, however, seem to count less in the opinion of the inhabitants of the megalopolis, since people continue to come to them, and all megalopolises around the world continue to grow at a very rapid pace. They have grown in number from one in the forties, to about 45 today. If we had the premegalopolises, the incomplete megalopolises which exist today, and if we take all of these 45 which we already have today, we then have more than half a billion people, something like 15 percent of the population of the world, already living in megalopolitan or premegalopolitan systems. This shows the speed and forcefulness with which this phenomenon emerges in our times.

Megalopolises around the world

In 1970, we developed another method of study for megalopolises, a method based on gravity models, that is, the degree of attraction between two adjoining centres. Using this method, we determine the degree of attraction between the major nodes, which has to be greater than a certain value so as to prove the degree of connectivity within a megalopolis. We have used the formula based on this gravity model, as a predictive tool to identify whether certain groupings around the world are or are not, a megalopolis, and if not, when in the future they are likely to become a megalopolis. As a result, this enabled us to show the year of emergence of each of 160 probable megalopolises by the year 2000.

For the Great Lakes Megalopolis, we determined 1965 as the year of creation of continuity between Chicago and Pittsburgh, which coincided with findings of studies by others. The Similarity Analysis gave an entirely analogous picture of the Great Lakes Megalopolis.

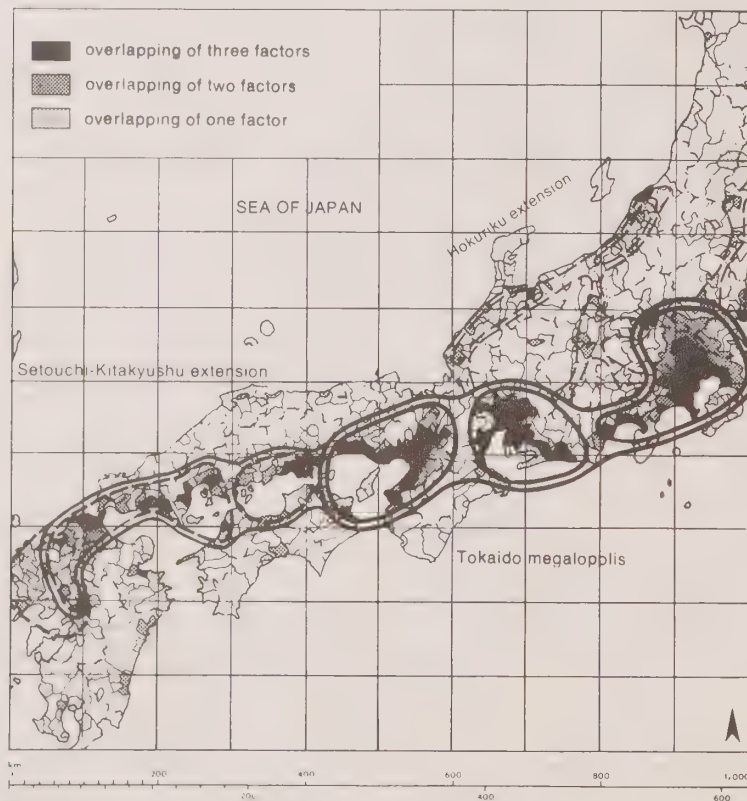
Another megalopolis studied by Mr. Milos Perovic, a graduate student at the Athens Center, was the Gulf States Megalopolis in the southern part of the United States. Here we tried various values for the exponent of the formula — the attraction is proportionate to the masses or population, and inversely proportional to some power of the distance. Our concern was to determine whether this power is two or one, and although we are not yet sure, it is probable that the best exponent is closer to one than to two.

In the United States at least, settlements generally seem to grow much faster in area, than in population. As an average, they grow at a rate which is about double in area than in population, so that if a settlement grows at the rate of 4 percent in population, then the area grows at 8 percent in area. This is something which we found all over the world.

The megalopolis in Japan (Figure 2), in the initial phase, stretched from Tokyo to Osaka, until about the mid-fifties; but then according to our formula, in 1966 it extended to the west end, so that by now it is a continuous strip.

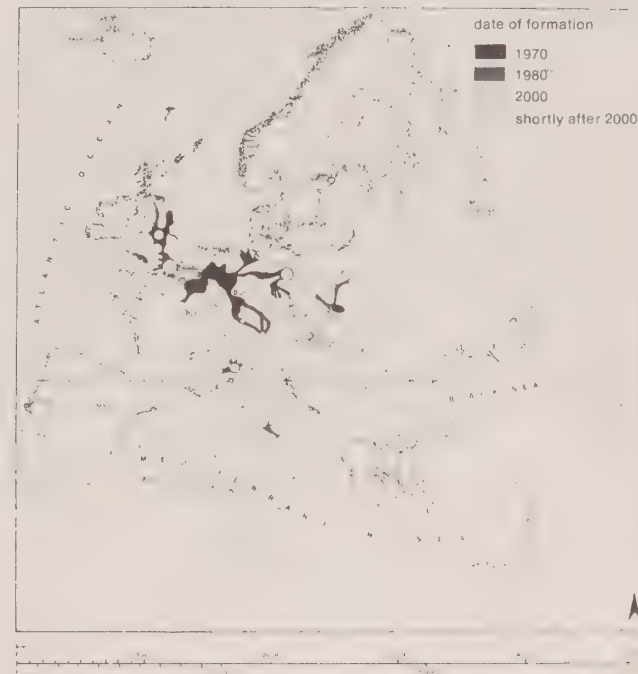
Figure 3 is a configuration of the European system of megalopolises starting from Paris to Belgium and The Netherlands, and then coming down its main backbone which has now reached Munich. Various other branches extend to Hamburg and Hanover, to Berlin; and from Berlin to Leipzig and so on. You see how complicated a system this is. This part of western Europe is really one of these megalopolitan networks or urbanized regions which I mentioned earlier.

Figure 2 Japanese Megalopolis, 1960



Source: *Ecumenopolis: The Inevitable City of the Future*, p. 105, Figure 37

Figure 3 Megalopolitan System in Europe, 2000



Source: *Ecumenopolis: The Inevitable City of the Future*, p. 303, Figure 121

The Great Lakes Megalopolis

With regard to plans for the future Great Lakes Megalopolis, there are various axes of urban development which form a rational grid (Figure 4). In between there are ample spaces in which vast areas of the natural, green spaces, can be developed. There is no overpowering continuity of built-up areas. On the contrary, the preservation of natural areas is quite possible.

At a smaller scale for the Detroit area, we find that in the future, the most advantageous alternative for development would be to develop a separate, large centre near Port Huron, north of Detroit. If this happens, it is something to retain in our minds from the point of view of its influence on the Canadian megalopolis.

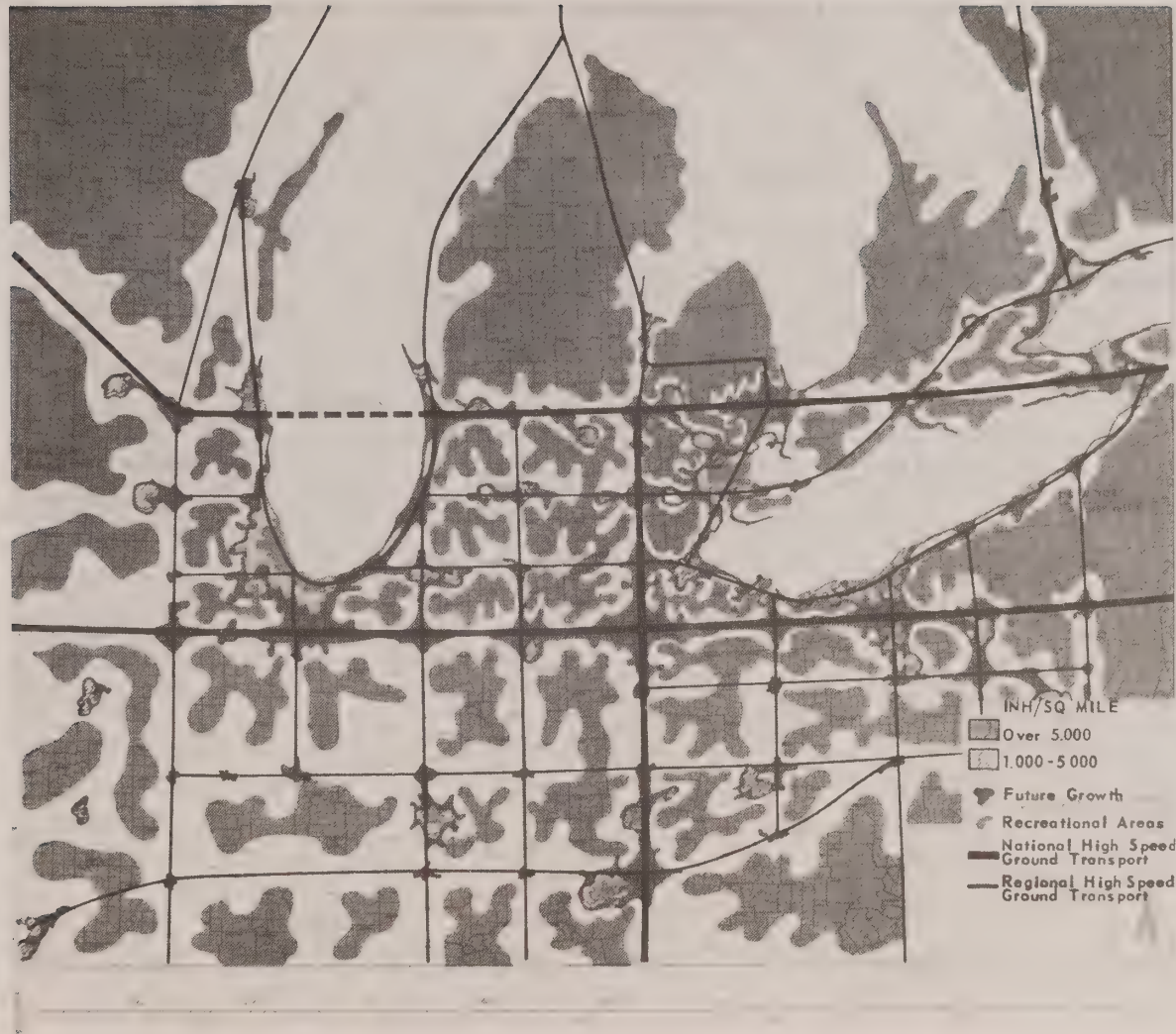


Figure 4 Great Lakes Megalopolis — A Rational Grid

Source: *The Developing Great Lakes Megalopolis Research Project*, Doxiadis Associates, p. 16

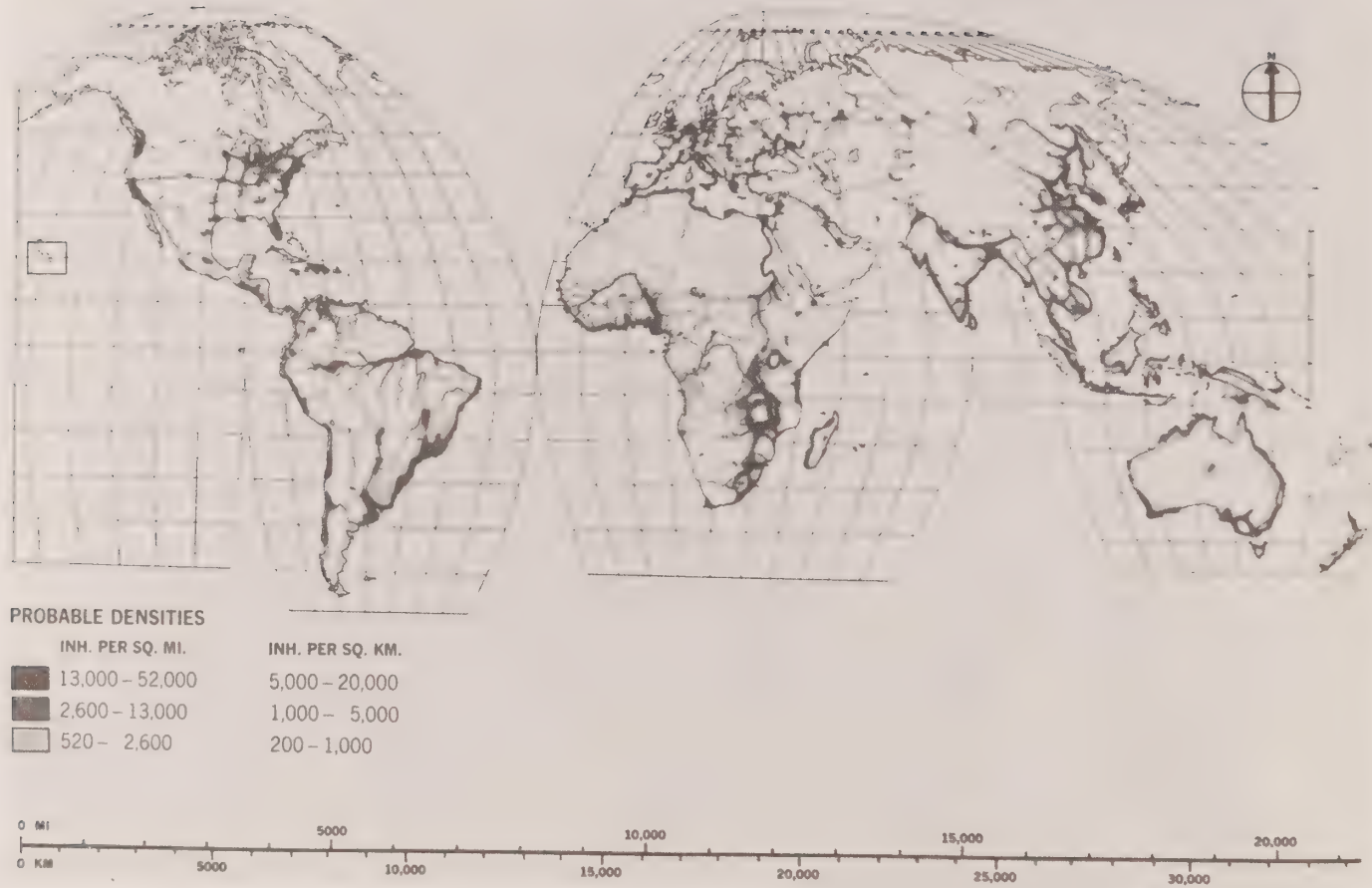


Figure 5 Universal City or Ecumenopolis a Century from Now

Source: *Urban Detroit Study*, Vol. III, p. 170, Figure 227

The Universal City

Figure 5 is a presentation of megalopolises around the world in approximately the year 2060, according to the predictive method based on gravity models. From the time this method was developed in the mid sixties, it has received rather good confirmation. From time to time we still receive reports from remote parts of the world saying that things seemed to have developed more or less as predicted by these studies. At a later date, maybe one generation later, the megalopolises will start growing into larger systems. At some more remote point, one or two centuries from now, we may come to a system like this. Although I say we may come, we believe — Doxiadis and myself at least, as do many other people — that something like this is an inevitable evolution, the result of the ideas related to megalopolises and larger systems of human settlements.

The result which is shown here is what we called “Ecumenopolis”, the ecumenic city, that is the city spanning all the habitable areas of the world. There was a definition of where these habitable areas are today, when this is expected, and within each habitable area, a grid system was developed which, of course, is deformed to a considerable degree by existing mountains, jungles, deserts, and other obstacles, so that it takes the form that it does.

What we found interesting was that although several models of Ecumenopolis are possible, — it seems that at least the configuration of the axis and centre as represented by something like this, seems to remain quite constant, even if you change quite a number of underlying assumptions. The relative weights may change, for example, if you have more people in Asia and fewer in America, or vice versa; but the general configuration of the axis seems to be something rather clear.

Figure 6 represents the same thing for the United States and is a still more remote picture of what Ecumenopolis may look like, when historical forces will have diminished and forces resulting from the necessity of adaptation to the natural environment reach a kind of balance between environment and man.

At last, we have a more regular type of grid spanning the earth (Figure 7). This may be in the remote future, two or three centuries from now. You may notice that as far as this area is concerned, not only around the Great Lakes but even to the north of Canada, there is a line showing that from Labrador south of Hudson Bay and going to the Yukon and Alaska, there is a faint axis which will also be interconnected by vertical lines to the rest.



Figure 6 Ecumenopolis in the U.S.A. a Century from Now

Source: *Urban Detroit Study*, Vol. III, p. 171, Figure 228

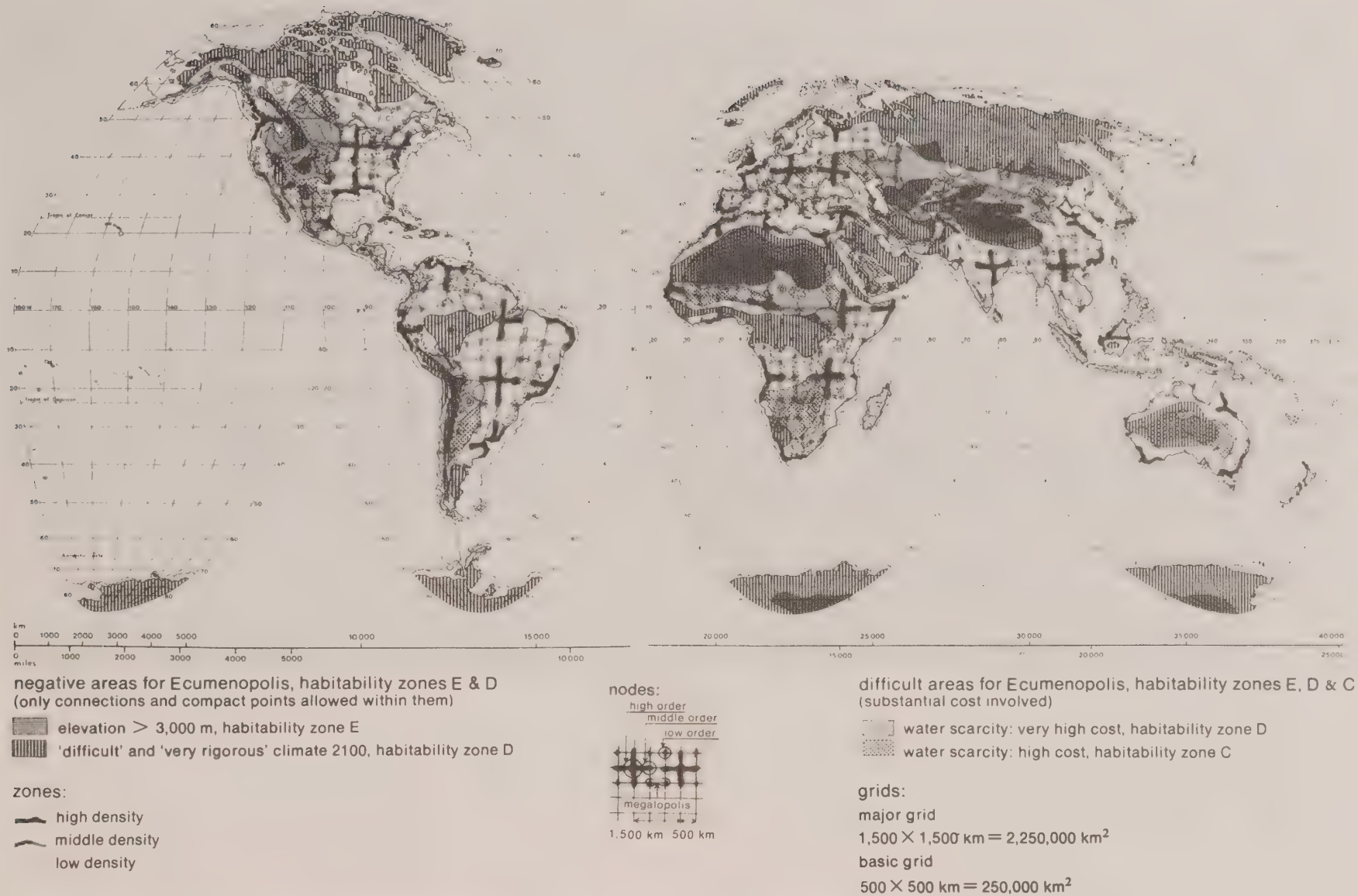


Figure 7 Ecumenopolis: Theoretical Configuration of Global Axis and Centres Adjusted for Distorting Factors

Source: *Ecumenopolis: The Inevitable City of the Future*, pp. 380-1, Figure 151

2 Big Pattern Changes

Don't believe the common statement that there is nothing new under the sun, and nothing new can be said. True, Solomon and Terence said that; but since their time, how much is new!
Francesco Petrarch (1304-1374)

The fourteenth century Florentine poet, Francesco Petrarch, expressed through his lyrics as well as through his prose, views and perceptions uncommon for his times. He introduced ideas which presaged the Renaissance by a few generations, yet even during the peak period of the Renaissance, no one living at the time thought of himself as the “Renaissance Man”. The epoch itself was so labelled only generations later.

Usually, humans have neither perceived nor understood the significance, or the essence of the times, within which their lives unfolded. Of course, the sensitive and the perceptive have frequently revealed insights and visions beyond the horizon of their own generations. The artists or the leaders have often, through their work or through their actions, heralded the emergence of ideas whose time have come, the new eras in human development — but invariably, the “man on the street”, as well as “conventional wisdom”, tended to be oblivious to contemporary reality.

As **Margaret Mead** points out later in the Symposium, the recent major exception is that three weeks after the bomb was dropped on Hiroshima, widespread references were made to the new “atomic age” that had just begun. But that was an exception for while some substantive changes occur with the dramatic instantcy of the atomic age, most others are gradual and unrecognizable until long after the fact.

The global urbanization process is a substantive change that was not generally recognized until this decade. Organized, properly structured and systematically correlated knowledge on human settlements is still relatively sparse and of recent origin. Understanding of the past evolutionary processes is vital in any consideration of the future. Moreover, if one accepts the premise that the urbanization process is an integrative one, continually influenced by the cultural, social, economic, political and technological complexities — one should then have little difficulty in accepting the view that in striving to properly anticipate urban futures, one must understand the ambiance within which the phenomenon unfolds and within which the forces of change develop.

It is safe to assume that today, as in ages past, there are ideas, concepts and processes that are at work, shaping the future; the risk is in identifying the real ones among the many. But in attempting to do so, one finds wisdom and assurance in considering the views of a number of leading contemporary thinkers from various fields, who are already shaping certain widely held views and concepts. If among these a consensus can be discerned, if there is a certain pattern of similarity and reinforcement, one can then consider as more likely or even probable — the future that emerges.

One such future that emerges as quite probable, if not as certain, is well summed up in a statement “. . . that we are moving from the phase of civilization to that of ecumenization.”¹ It is significant that there is a considerable accumulation of views by the leading contemporary thinkers, which support and reinforce this statement.

C.A. Doxiadis has as far back as 1961², developed the concept of ecumenopolis, the global system of interconnected human settlements — as the largest possible form of settlement on the planet Earth, which will appear at the time the ultimate, balanced population level is reached.

Similar concepts of “oneness” of the global systems are developed in the “Only One Earth”³ volume, prepared by Barbara Ward and Rene Dubos for the UN Conference on Human Environment, held in Stockholm in 1972.

Martin Luther King addressed a different aspect of the same ecumenic concept when he said: “Through our scientific genius, we have made of the world a neighbourhood; now through our moral and spiritual genius, we must make of it a brotherhood.”

R. Buckminster Fuller, in his comments to the Symposium and in speeches on numerous other occasions, has pointed out that: “With the resources we have already mined, refined and have to work with, and with the knowledge we already have, we can now take care of all humanity at a higher standard of living than anybody has ever known.”

It is not difficult, then, to see how **Marshall McLuhan's** concept of “the global village” (late fifties) originally applying to the village gossip made possible by the instant radio/television communication system of the “electric age” appropriately matures into a global system of human settlements, ecumenopolis.

It is then into this ambiance of the maturing global consciousness, that we must place megalopolis as a phenomenon, in order to better perceive its impact on the larger scales of space and time; megalopolis and megalopolitan chains such as the GLM can readily be perceived as the building blocks, as the links of the global ecumenopolis.

If we are correct in this perception of the global future of human settlements — and considerable evidence suggests so! — then this is quite important for our megalopolitan, continental and global policies and undertakings: we can enhance the process and help make the world “... a brotherhood” (with whatever difficulties and disappointments that might yet entail), or we can draw demarcation lines and engage in the costly and wasteful feudalism of the Dark Ages.

Professor Marshall McLuhan, Professor R. Buckminster Fuller, and Dr. Alexander N. Christakis, discuss different aspects of the global setting, within which megalopolis must be viewed.

2.1 Human Technology-Extensions

In discussing the transition, McLuhan anticipates that society is going to go through the cycle ... “this time the huge cycle of development, awake — for the first time in human history.”

One of the advantages of humour is that it enables you to spot the areas of grievance, abrasive encounter and irritation. All jokes are immediate reflections of areas of irritation and pain. It is easy to illustrate this principle; any one-liner will serve. I am reminded of that delightful “morning smile” in the newspaper the other day. “Is this the centre for the war on poverty?”, someone asked. “I’ve come to surrender.” This applies to a lot of us conducting wars on all sorts of problems. Most of the audience is prepared to surrender right away. Remember when there were streakers around a few months ago. Somebody said they were just a passing fanny. But the streakers were, by charade, trying to dramatize the loss of goals in the electric world. You cannot have a goal at the speed of light; you cannot have a goal at the speed of electricity: you’re already there, which means you are in trouble. The streakers were trying to dramatize this crazy situation of improved communication which is in total breakdown.

There is a more familiar type of irritation in the most narrative style of joke. I asked a friend of mine, when he was going to Russia a few months ago, to bring me back a Russian story to illustrate some of their grievances, and he brought back this one:

The Russians had set up as a trial, a Hollywood style nightclub which had come to nothing; it had failed completely. They wanted to know why, so they had an investigation and they asked about the food and were told that they had an excellent French cuisine with French chefs, good wines and low prices. How about the decor? They said it was tops; they had Hollywood designers with Italian consultants. And how about the girls? Oh well, they were special, super: they’d all been party members since 1917.

Dali, the Spanish painter, shows in one of his paintings the premonition of Civil War, a giant writhing human body, severed limbs, tearing at each other in mindless frenzy. This is not a bad image of megalopolis, because it is a human body, tearing at itself in mindless frenzy. In primitive societies, it is normal to consider any village or any town a cosmos and the words for village are cosmos, or sky, or world.

Some of the great writing of our time has celebrated the city as an extension of the human body, notably, James Joyce in “*Finnegan’s Wake*” and in “*Ulysses*”, where all the action of the novel takes place as the extension of the human body in the city. “*Finnegan’s Wake*” implies, among other things, that in this particular time, we are going through the *fin* cycle once again, but awake.

We are entering a new travel society, where the togetherness of people is so intense that society is like a single tribe, a single family. This intensely integrated and interrelated body of beings, is going to go through the cycle, this time the huge cycle of development, awake — for the first time in human history.

So Peter Medawar, in a Smithsonian article recently said: “... the most human thing about Man is his technology.” Behind that observation is a rather interesting set of implications and I think it concerns all of us here, a propos the city, because the city is an extension of man and is very, very much a technology. The peculiar thing about technology is that, as it extends our faculties and our powers, it also creates bridges between areas where previously there were no bridges. Language also does this. The word “metaphor” means a bridge, a carrying across from one area to another by setting up complementary situations. These utterings are utterings of our bodies whether they be in the form of a pencil, a zipper, or a bulldozer; they are literally and in the fullest sense linguistic forms, with their own semantics, syntax and grammar. Every single technology, every hypothesis ever conceived has the character of the linguistic entity. The advantage of recognizing this fact about technologies is that they are extremely human, subject to human confusion, frailty and understanding.

All languages are bridges between situations, and all bridges and all technologies are linguistic in character. In the age of great linguistic (perhaps

elinguistic) study we live in, it is nice to link the full heritage of linguistic study to the heritage of hardware technology, because when you recognize the linguistic character of all technology, you will understand that there is no separation between hardware and software. Hardware and software are equally linguistic. Man's reach must exceed his grasp or what's a metaphor? These utterings are utterings (perhaps outerings) of our bodies (and they can be private body or corporate body) with their own grammars and their own syntax. People who are ungrammatical and illiterate in these matters naturally are not well suited to conducting human affairs.

Privacy

The gap between the hardware and the software is one of the big grammatical boobytraps of our age and I suggest that, in the age of electricity, the dividing line between hardware and software has collapsed completely. Let me illustrate using the motor car which is a bugaboo and a scapegoat for many of our meditations. In North America, the motor car is the supreme form of privacy. It is not so in any other part of the world. The tenacity with which North Americans cling to their monstrous boxes is there, because, in them, they are alone. The only people in the world who go outside to be alone are North Americans. In every other part of the world, people go outside to be social, but in North America we go outside to be alone. This is easy to illustrate: we go home to be social, and all other people go home to be private. There is no privacy in the North American home. If you want to write a book you had better get a grant and leave home. The total absence of privacy in the North American home is not an accident, and this is totally misunderstood by Europeans for whom the home is private. The North American has no capacity for socializing outside the home and has no institutions which permit it, no cafes, and no pubs; so, when he goes to a nightclub he goes to be alone.

This is an amazing, hidden dimension in all North American ideas of space and city life. It means that we will never permit public transit, we detest elevators as much as we do subways because we can not stand socializing when we are away from home. Planners don't seem to know about this and this is typical of the blind spots, huge blind spots in the ordinary type of analysis today.

Hidden Ground

One of the strange hidden capacities of all innovations, all technologies, is that they retrieve or bring back things which have been pushed out of sight for a long time. The motor car brought back the knights in shining armour.

That's why the motor car is a status symbol of considerable importance. But it's a hidden factor. The American in his car, is a knight in shining armour, and he is not going to be unhorsed; the European in his car is merely in a plaything, a toy.

The ground of any operation is always hidden. Most people treat the motor car as figure, ignoring its peculiar dimensions and dynamics. The ground of the motor car is the message of the motor car and it is a vast one that penetrates every aspect of social life. The figure of any technology does not constitute its ground and does not constitute its message. The tunnel vision of the systems analysis people is incapable of dealing with ground. It is only capable of dealing with figure; and it's like dealing with the motor car minus the highways, the factories and the oil companies.

The Club of Rome is a notorious example of the incapacity of "tunnel vision people" to cope with the social realities of the world. The Club of Rome concentrates on a few bits of hardware which have nothing to do with the medium or the social ground in which hardware exists. Tunnel vision, the technique of looking at goals and targets without seeing the total surroundings in which they exist, is a normal incapacity of highly literate people. It has led to a great many achievements, but at the speed of light, at electric speed, tunnel vision becomes a serious menace to the existence of mankind.

Outside comes Inside

Television, on the other hand, brings the outside inside and abolishes that whole dream of the North American, the dream of going outside to be alone.

The North American way of life is collapsing quickly with television; on many fronts. But the motor car is the first victim because the North American no longer has to go outside to be alone. The outside now comes inside the sitting room, inside the home where he enjoys social life and social values. So the North American is in a state of complete cultural confusion and mixup, resulting from this interplay of the old hardware and the new software. The TV image or the surround of software information is eroding all the old hardware patterns everywhere in the world. The third world is completely surrounded and dominated by a fourth world of electric information. Before the third world will ever get the first world or get industry, it already has twentieth century in software form. Nobody is prepared to explain what this means to the third world. What do radio and television mean to India, China, Africa? Certainly not what they mean to the first world or to the industrial world.

I suggest that the software image of the TV form is capable of dissolving the hardware substance of the world, of the motor car and of the factory; it is closing the space between home and work quickly. The first world has depended for a century or more on a considerable separation of work and home for purposes of production, and the North American has gone outside to be alone at work as well as at play, for a long time. That's about over and you can't name a bigger revolution, I think, in the human psyche than that one which is being brought about unacknowledged and unnoticed, by new hidden grounds of electric information.

2.2 Universe is Trying Hard to Make Man a Success

The ability to discern patterns and discover some kind of order in an apparently amorphous, chaotic subject under observation, has led man individually and as a species, out of the dark depths of ignorance and confusion to where he is today. For better or for worse, a certain orderliness of the universe and even of man's actions within it, has emerged, particularly during the past three millenia of recorded history.

In fact, assessments and judgements of ideas, events, and people, are frequently made on the basis of how close they come to the perceived order within which they are viewed.

Often, when changes occur, new reference points emerge and even new orders are created; when changes are rapid and many, bearings are easily lost and confusion and fear become "the order of the day". It can safely be said that mankind is now going through such a phase of rapidly accelerated changes and that confusion and fear are increasingly forming the basis for action. R. Buckminster Fuller discusses the process of the big pattern changes within which urbanization should be viewed — and then opens doors to new levels of understanding of what the future might hold for man.*

I would like to pursue some of the big pattern changes that I have personally witnessed, in order to see if I can bring before you some convincing evidence of the great surprise which will soon be upon us.

There has been no time in history when humans have been so aware of humans everywhere. I was born about 80 years ago and I have seen a great deal of change in the patterns of where and how human beings are living around our world, and a great deal of change in what human beings have

known about, have thought about, and have been able to predict about the very changes which are ahead. I am deeply aware that human beings have not been sufficiently effective in foreseeing the powerful changes coming upon them. I am therefore not surprised that the megalopolis has come upon them in a totally unexpected manner.

I must start my thinking by remembering that all human beings have always been born naked, absolutely helpless, with no experience; therefore, absolutely ignorant. We have all started that way, and that we have been able to come as far as we have, to advance by trial and error, to learn words to speak to one another — is to me miraculous. We have come a long way and we have a powerful vocabulary today. I have to think about the scale of information that human beings have now.

On the picture of the earth we have taken coming in from outer space, we see the blue of the sea, we see the brown of the land, but human beings are utterly invisible. And ours is a very small planet, one of the smaller ones; our sun is rather an inferior size star in our galaxy of a hundred billion stars; and we now know of a billion galaxies.

I am therefore quite confident that the universe is not waiting for some decisions of communists or capitalists on the planet Earth, wondering what they are going to do next. I don't think that the universe is operating on that basis. I don't think that the universe is saying that we can't afford another of those galaxies. I don't think that such words are used by the universe. And so I don't become too alarmed when human beings, myopically preoccupied as we are, are alarmed.

Human experiences are based on seasons. Through long years of accumulated experience based on concerns of whether the harvest is coming in this year or not, whether they have stored enough food and supplies to be able to survive or not, humans have learned and done most of their counting. So we do tend to think in short terms of yearly increments. We find that even the power structures have to think in such terms; the politician about his next election and the president of a great corporation having to make a profit within two or three years or face losing his job. So, this is how there is a fundamental myopia really imposed on man. This is why he counts things, and this is why he thinks in such short terms.

On the other hand, I find that the universe is operating in this beautiful, extraordinary pattern that sometimes takes millions of years. In any case, the most important things take the longest. I am quite confident that humanity is going through a powerful evolutionary pattern change that was not planned by humanity at all and I would like to give you what evidence I can of it.

*R. Buckminster Fuller of University City Science Center, Philadelphia, Penn.

Communications

I was born in a little town outside of Boston, Massachusetts in the United States, and in the year I was born, Marconi discovered the “wireless”. I was 12 years of age when the first “SOS” occurred, the first practical use of the wireless, yet the people were saying — “wireless, an absolutely impossible thing!” I was three years old when the electron was discovered, but few paid any attention to it. I was seven when the first automobile came into Boston, and like many of the other children, I was trying to make little flying machines, but we had been told by our parents that for human beings to fly is inherently impossible — but when I was eight, the Wright Brothers suddenly flew. I was told we would never get to the North Pole, but when I was 14 we got to the North Pole. When I was 23, we had the first voice on radio. When I was 27, we had the first licensed broadcasting station of voices.

Historically, humans like many other of the mammals display a pattern where the male seeks out a large hunting area and the female bearing young, stays in the small areas. And this pattern was maintained with human beings over millions of years — where the father brought home the life support, and mother decided how to convert it to the highest advantage. The father and mother were telling the children whatever there was to be told. They told them about the things that older people had learned and what they should know. The parents were the absolute authority about what went on in the world outside their home. The way the father heard things said, was the way he tried to formulate the sounds, but he often changed the sounds quite a lot. Yet the way the father said it, was the way the daughter said it. The father was the absolute authority. I am sure that alliterations and dialects multiplied rapidly in this manner.

But one day, when I was 32 years of age, in 1927, as the fathers were coming home at night, suddenly the children said: “Listen Daddy, come in quickly, listen to the radio — a man is crossing the Atlantic alone.” That evening, Daddy didn’t bring home the news; and he hasn’t brought it home ever since. The point was that until then, Daddy was the authority — Daddy said things; the parents were the absolute authority, but suddenly something happened that changed all that.

Then suddenly a few years later, we had another change in history, also absolutely unexpected by man — we had the first television programme. I was 55 when the television was introduced to the American family. The students of Berkeley, California, in 1965, were the first to make the world news as dissidents. Whoever thought about the fact that most of them were born in the year the television came to the American family? With

television, we have suddenly the news and knowledge disseminated, not just at the speed of sound, 700 mph, but at the speed of light, seven hundred million miles per hour; a million times faster. Sound can only go in the atmosphere, so it is limited within our universe, but light goes all around in the universe. You and I, as we look up into the clear night sky, can see with our naked eye a drama, a live show which has taken place millions of years ago. The hearing language is all esoteric — ethnic, but the sight language is all the same.

So the useful thing about television was the speed of the dissemination of knowledge. And by this time the communications capability, completely unexpected by anybody, was arousing the whole world. The whole young world at the time of the Berkeley riots had been born with television coming into their homes. All of the children having the ability to see, knew about all of the world that was in trouble, so the compassion they felt was for the world; one could never again compress that young group into just the neighbourhood, the local community or the country.

Movement

I found a great change going on in the world, when the airplane came in. In 1961, an important event was pretty much unnoticed by the world, when three jet airplanes had just gone into the air flying. In 1961, this much less expensive and obviously much faster means, became the obvious way for human beings to get from one place to another. Again, this was an abrupt kind of thing and had not been expected at all. But suddenly, it is here.

The pattern I am showing you is not really considered when people are looking at the world, but it is our new world when 80 percent of humanity could reach each other within the shortest great circle air routes, without going near the Atlantic, the Pacific or the Indian Ocean.

Several big things happened here. One has been going since World War I. Of the 80 percent of humanity who were on the farms in America almost all have left the farms. This happened because the food used to be on the farms, and you had to be on the farms if you were going to get the food; there was no way of preserving it and sending it any great distances. Suddenly both the canning of foods and refrigeration came in. With World War I, we gained enormous production-machinery and productivity, a great deal of which after the war went into making farm machinery — and mechanization of farms began to take place. As those who are still on the farm today know, it originally took only 400 acres of farm to make farming pay; then it went to 1,000; and it is approaching 1,500 acres today. So the people who no longer could live on the farms floated into cities.

In recent decades, an enormous amount of affluence was being generated by the increase in know-how that came in particularly with the peaceful application of World War I technology. Between 1900 and today, we have gone from less than 1 percent to 54 percent of humanity enjoying a higher standard than did any king before the twentieth century. This is an extraordinary, absolutely unexpected change, creating enormous affluence, particularly on the North American continent.

The City — Stock Exchange for Abstract Values

Interestingly enough, cities are becoming primarily educational centres. Whereas before they used to have the manufactured, physical goods come into or out of them, now the manufacturers have all gone out and the physical part has been deployed. What goes on is completely abstract, an abstract stock exchange of values, knowledge and information; with enormous universities growing up as educational centres. Yet the educational facilities as designed were not designed for that kind of enormous load by humanity. Educational functioning is unquestionably going to turn into electronic means of call-up, where anybody who really wants to study any subject, wants any real knowledge, will be able to call it up on his TV. All universities still operating then, will be great documentary studios, where the people who are on campus, are there because they really love education, love pursuing the subjects and are really committed to the making of competent documentaries.

Accelerated Rate of Change

Now, I want you to feel with me a little, the big pattern of acceleration.

Figure 8 is 800 years long, from 1200 A.D. to 2000 A.D. I wanted to determine the effect of science on humanity. In science, we have 92 regenerative chemical elements. This is the chart of the rate at which human beings discovered and isolated those 92 regenerative chemical elements. Post uranium elements are also shown on the chart. On the lower left hand side, there is a column of 9 names: copper, gold, silver, tin, mercury, iron, sulphur, lead and carbon. These are the 9 which were known to humans as history opened. We do not know when they were discovered and put to use. On this chart, we go up one step every time we isolate chemical elements, so the chart starts at 9 steps high, due to those 9 known discoveries. The first known isolation of a chemical element was after the year 1200. There is a 200-year ride and we come to antimony, in another 200-year ride, we come to phosphorous. Then the whole thing goes rapidly. There are

slowdowns, and shoulders of slowdowns and there are accelerations. The slowdowns are all during wartime, because pure science does not prosper during wars, although discoveries made before the war get to be used. Then we get up to 1932, which is called the “depths of the Depression”. That happens to be the year when the ninety second isolation of chemical element by man occurs. In 1932, the scales are full of exciting discoveries, including such milestones as man at last being able to understand the fundamentals of energy and matter.

Those chemical elements and their numbers occur in the order determined by the number of their protons. But they are not discovered in that order! Maybe the thirty second isolation of chemical elements might be chemical element number seven. So, they didn’t come in by the numbers. But from 1932 on, as we get into the “post uraniums”, you might not have noticed that the top part of the chart is quite orderly, as there, they come in by the numbers. Chemical element number 95 is the ninety-fifth isolation. The ninety-sixth isolation is chemical element number 96. This is an absolutely new pattern developing on the face of the big events of humanity. What I then wanted to see was what human beings could do within this new pattern, in relation to their environment. So I set up a challenge, which will be for human beings to set out an environmental control system that made it possible to exist under conditions under which they could not exist before, and from within such actual environmental control system, to control anything outside that system.

Transportation

You see that at the top left on the chart, is a wooden sailing ship. This is the first time that man developed a means of control which enabled him to go around Cape Horn, where sometimes the waves are as high as a 10 storey building but a ship like this enabled him to negotiate recirclement of the earth controlling the energies from the outside, the winds outside, to propel him around the globe. Then, there is a 350-year lag until we come to the steel seaship; and there is a 75-year lag and we come to the airplane. There is a 65-year lag and we come to a sonic metal rocket. But, the wooden sailing ship took two years to go around the world, the steel seaship took two months, the first aluminum airplane took two weeks and the sonic metal rockets went around in a little over one hour. What you see here, is a third power acceleration, the basic acceleration of science and also the acceleration of the attraction of the periods of the completely new epoch. And significantly, there is the third power acceleration in the rate with which we go around our little planet Earth.

So, what you are looking at, makes implicit the rate of contraction; what you realize is that nobody at the time of that wooden sailing ship foresaw the steam seaship; nobody at the time of the steam seaship foresaw the airplane; nobody at the time of the airplane foresaw the rocket. So what you are looking at here, tells me that by 1985, I may be sending you around by radio. At one time, each of these stages seemed more or less incredible, but we must understand that great changes are going to occur. So on top of the considerations of the megalopolis, and in view of our responsibility to humanity, I couldn't be more respectful of the purpose that is manifested in such a medium as this Symposium, of trying to accomplish something, so that we can do things in an orderly way, from now on.

From everything that is going on around us, it seems to me that apparently, the universe is trying hard to make man a success also.

If the universe is trying to make man a success, man must also try, rather than entrap himself in actions which lead to counter-productive results. To do that, he must enhance his understanding of universe and how it operates. Professor Fuller addresses his remarks largely to the problems of energy, but they have vast implications for the future of human settlements.

Universal Energy

I had a great oil geologist do a study for me. He was able to develop a scenario of what nature had to do by means of the sun's radiation, photosynthesis, and all the functions needed to produce the vegetation, algae and the various biological residues so that the hydrocarbon molecules would, after going through different stages over millions of years, and under certain energy conditions, produce a gallon of petroleum. What we wanted to know was how much energy did nature expend and for how long did it maintain the pressure, heat and other energy investments to produce a gallon of petroleum. He was able to discover exactly that.

We measure energy, by lifting a given weight to a given height for a unit amount of time, to give foot pounds per minute or centimilligrams per second; and we transform that into joules and kilowatt hours. His findings were transformed at the rate which you and I pay for our electricity from the public utility company, and it came out in the magnitude of one million dollars for a gallon of petroleum — and man had been saying that it cost nothing; you just put a pipe down. He was not paying attention to how long and how much energy nature accumulated, to produce that gallon of petroleum. Energies that are exported by the stars must be collected somewhere, because energy is neither created nor lost. Part of the universe is eternally regenerative and our own little planet is one place where energies

are being collected, even from stars possibly 20 billion years away. But they say we have in our century, tapped and almost exhausted the petrochemical energy accumulated over millions and millions of years. So this is a foolhardy rushing of humanity and I will not be surprised that we would soon have to know exactly how to use the energies in this universe and how to exchange energies completely. Metabolic accounting is essential and can be applied to the whole of maintenance of life on our planet.

Environmental Controls

I would like to introduce two more main sources of information concerning human settlements. One is that I have learned a great deal in the development of environment controls from the geodesic structures. As the engineers who worked with me agree, none of the engineering sciences will accredit anything of what we call compactual continuities. There is no accrediting to what we call tensegrity. Tensegrity is the structural system the universe uses where the moon and the earth do not touch one another, being suspended through tension of gravitational forces, while stars are islands of compression. Tensegrity structures have no limited size. Compression columns have a limit of cross section to length obviously, but in tension there is no inherent limit of how long a span they have. So with tensegrity, we can build powerful, large structures. But they have never been accredited on that basis, although they are now beginning to come in and engineering is beginning to learn how to actually do that kind of analysis. I know now that it is completely feasible to house all humanity as far as good, powerful environmental controls go.

In 1951, we made a miniature earth within a study of something I called the World Game, a process of investigation and study of total world resources, total population, total human capacities, with absolutely no attention to national boundaries. I have been able to learn a great deal with the World Game and have been able to develop a number of prognostications that have come out fairly well.

Early last July, at the University of Pennsylvania, we held a World Game seminar of a group which had been participating since 1969. They took on the energy problem of our time. They went into it using only the proven resources.

At any rate, taking the known resources of water power; adding them to the known developments of tidal power and using the proven technologies of various energy sources; taking the thermal energies of the subterranean infernos and taking into account the wind power, the methane gas, and the methods of utilizing the sun's radiation energy; using only annual energy

income, we produced data which makes it incontrovertible, and highly feasible, with known resources, technologies and rates of producing the technology to get all of humanity enjoying by 1985, the same energy advantage enjoyed by the United States in 1972. At the same time, we can completely phase out the use of all fossil fuels, all atomic energy and any further experimentation in fusion.

When I saw this report, I was astonished at its significance, because so far, there has been no known alternative to society. The report is coming out in a book called *Energy, Earth and Everybody*.

No Need for Power-Politics

I know now that it is actually feasible to take care of all humanity, both in terms of environment control, and in terms of living on our energy income. Therefore, I know that the working subjects of all the great ideologies which hold that there is nowhere nearly enough to go around, are invalid. I know then that war is invalid.

These are extraordinary awarenesses. The key question is whether humanity is really going to be able to learn that it does have options, that it does have prospects for success and not failure.*

2.3 Human Settlements: Window to Contemporary Reality

The Big Pattern Changes which Professor Fuller talks about, have profound implications for what man does on his "Only One Earth" — and how he proceeds from here onward. The task of providing for those now living and for the future generations yet to come, remains. The challenge of helping the universe make man a success, grows in intensity when juxtaposed with the alternative of the degrading settlements that destroy human dignity.

Humans must learn how to work with the universe and how to turn the crises brought about by the big pattern changes, into opportunities.

Dr. Alexander N. Christakis charts the way, as he first discusses the properties of large systems and then demonstrates that our methods, technologies, and epistemologies must be embraced by a holistic, ecosystemic, science of human settlements.

*R. Buckminster Fuller of University City Science Center, Philadelphia, Penn.

First, I must explicate two basic assumptions underlying my view of the contemporary world:

Assumption 1: The world is becoming rapidly more and more interdependent and intersensitive. One way of visualizing this phenomenon is through the "image of the future" represented by the *Ecumenopolis* of C.A. Doxiadis, which is gradually becoming a reality. However, the convergent crisis of worldwide inflation, the ideological schisms, the energy crunch, and the looming food shortage, may represent insurmountable barriers to the emergence of a global, symbiotic, and heterogeneous human settlement.

Assumption 2: To surmount the barriers to the emergence of ecumenopolis, we need to invent new concepts, new methods, and new institutions. We need, in other words, a new policy science paradigm⁴ that will facilitate the transition from an era dominated by economic growth rationality, wasteful consumption, and meaningless affluence, to an era of anticipatory democracy, cooperation (symbiosis), and restraint.

A possible means of interconnecting the above two assumptions is for citizens, decision makers, and policy makers to internalize that the existence of such new entities, such as the megalopolises of the world, already demand a contemporary methodology (or better epistemology) in order to deal with their continuous critical problems.⁵ Ekistics, as the new science of human settlements, represents a new epistemology, i.e., a new way of perceiving, organizing, and communicating our contemporary reality situation.

Texture of Settlement Reality

The rapid concentration of people into megalopolises has to some degree aggravated and produced many of our continuous urban problems of congestion, pollution, ill health, crime, loss of community identification, and governmental fragmentation. While we seem to be tending towards much greater levels of population agglomeration, opinion polls inform us that an absolute majority of people in the West would prefer to live at a much smaller scale of community. Thus, a major dilemma emerges: on the one hand, our distribution projections suggest continued growth of population concentrations; on the other hand, there are indications that these trends are neither preferred nor perhaps desirable for the Quality of Life (QOL) of a substantial proportion of the people.

When we ask if there is an "optimum" city size, we are really asking: what is the urban scale most conducive to the realization of some desired QOL? Since the reality perceptions of peoples' desirable life styles are diverse, it

follows that the policy planning process should be embedded into a nested hierarchy of human settlements (as represented graphically by the Ekistic grid)⁶ that satisfies the needs and values of all people.

As policy scientists become more selfconscious of the complexity of the policy planning process, and the limitations of classical pseudoscientific approaches to extrapolative planning, a new philosophy about the role of planning is emerging. The emerging position is that too much emphasis has been placed in the last 15 years on the use of mathematical simulation and optimization modelling.⁷

The contemporary attitude is oriented towards futures-creative planning, i.e. adaptive, participatory, and anticipatory modelling of a particular cultural situation. This position is based on the premise that the value of planning to citizens, decision makers, and policy makers lies primarily in their participation in the process, and not in the production of a document representing a regional development plan. Futures-creative planning is at the same time more demanding on the part of the policy scientists because it requires: (a) a deeper understanding of the design implications of the diversity of reality perceptions, and of the cultural dynamics of collective and individual behavior, and (b) the explicit adoption of an ecosystemic hierarchy of human settlements that extends from the ecumenopolis, to the various megalopolises throughout the world, to the small local community.

Megalopolises offer desirable life styles — such as socioeconomic diversity, cultural options and amenities, anonymity, and opportunities for personal achievement — for many people. For others, they represent undesirable entities because they give rise to such attributes as underlying homogeneity yielding a superficial diversity, alienation of the citizenry, too much competition, etc.

Properties of Large Systems

In a recent report prepared for the National Science Foundation by the Stanford Research Institute a number of properties for large systems have been identified by the researchers:⁸

- Large systems may grow to a point where they yield diminishing returns to scale — particularly when considered from an overall socioeconomic perspective.
- Large “successful” systems, premised upon plentiful resources, can become unsuccessful when confronted with scarce resources.
- As system size increases, interdependence increases and, in turn, vulnerability of the system to damaging perturbations increases.

- The highly specialized work roles implied by the division of labour found in large urban systems, may contribute to worker boredom, absenteeism, lowered productivity, and lower product quality.
- Large systems are generally complex and that complexity, in turn, limits the rate of effective acquisition and use of knowledge.
- As the effective comprehension of highly complex issues becomes more difficult for the policy maker, decision maker, and citizen, increasing reliance is placed upon specialist/experts, i.e., persons who are essential to the system but are not responsible and accountable.
- For those who cannot specialize, given their mandated broad focus of concern, e.g., the mayor of a city, complexity reduces the comprehensibility of the system being governed and increases the likelihood of attempting to employ simple solutions to solve difficult problems.

Given the continuously increasing complexity of our human settlements and our lifestyles, what is a reasonable path for dealing with the increasing complexity? According to Stafford Beer:⁹

The answer of man the manager to this problem is precisely *organization*. Proliferating variety is held in check by our organizational refusal to consider more than a tiny part of the problem at once. Nor will we normally consider more than one time epoch at the moment of decision. Anyone who tries to look more than a week or so ahead is likely to be written off as a visionary. Thus our great issues reduce to a scale with which our cranial computers feel they can cope.

Role of Ekistics

Assuming the contemporary situation as we described it so far, what is the role of the science of ekistics in general and of ekistic networks in particular?

First, we must recognize that what we desperately need is not better physical transportation networks but significantly improved communication networks. By communication networks, I mean our ability to understand, explain, appreciate, and share our contemporary human settlement reality situation. In order to achieve this objective, we must begin to operationalize the following two propositions which represent a significant agenda for ekistics:

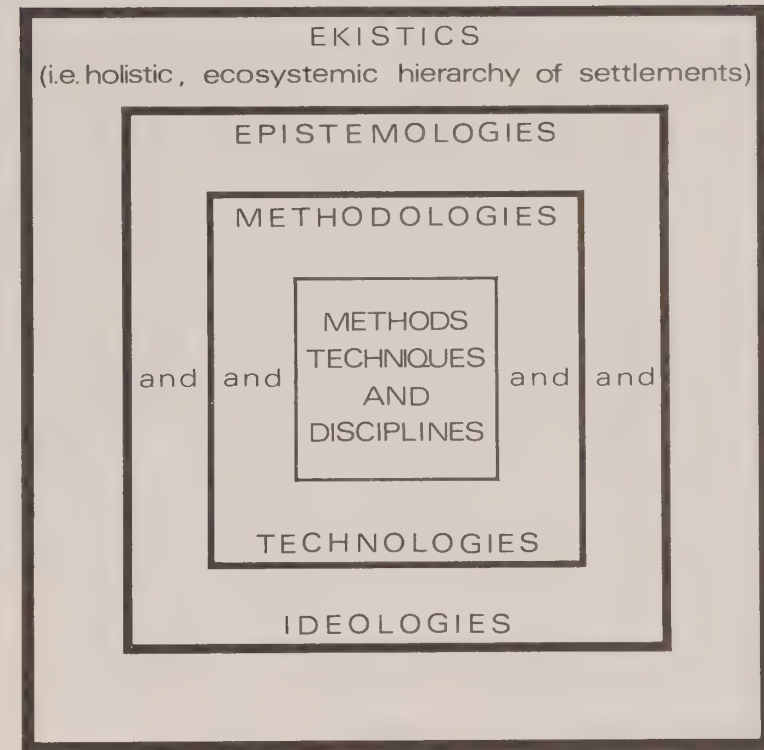
- 1 Human settlements are fundamentally different entities (or systems) than the mechanical systems with which classical science has largely concerned itself;

- 2 The human settlement methodology must differ radically from the traditional scientific methodology. It must be value and culture-sensitive, holistic, anticipatory, and truly participatory.

These two propositions represent a very significant agenda for ekistics. Their conceptual implications are schematically depicted by means of Figure 9. In this Figure, a series of embracing contexts are presented like a nested set of Chinese boxes; methods are embedded in methodologies, and methodologies in epistemologies, and finally all must be embedded within the science of human settlements which by definition, spans the globe. Methods such as input-output analysis, impact matrices, relevance trees, scenarios, and the like, are the components of a methodology. Epistemologies, on the other hand, are the context in which methodologies are embedded. Very different methodologies may flow from different epistemologies. What is meant here by epistemology is a system of philosophical concepts representing perceptions of reality held by individuals, groups, cultures, disciplines, etc. For example, the Greek-European-American epistemological tradition has been based on the logic of opposition (which point of view is right and which point of view is wrong), while the Chinese epistemology emphasizes the logic of complementarity (black and white are not perceived as opposing colors but as mutually dependent and reinforcing). Finally, the science of Human Settlements must of necessity embrace all the diverse epistemologies which manifest themselves at different geographic locations on the globe.

I can envision through such a scientific approach as a truly contemporary ekistics framework represents, the gradual establishment around the globe of diverse cultural networks symbiotically interconnected through a common language, namely, the language of planetary symbiosis.

Figure 9 A Series of Embracing Contexts



Source: Alexander Christakis

3 Humane Megalopolis

C.A. Doxiadis has pointed out more than once that although our settlements are the settlements of man, they are no longer human, that is, they are no longer able to preserve human identity on a human scale within settlements which are assuming superhuman proportions.

The gravity of this realization hits hard in an epoch where anthropological concerns lead — not only to a marked predominance over cosmological and theological concerns of the past — but to a centrality which promises to define the modern age itself. More than ever before in the history of thought, anthropos comes to be a particular object of wonder and reflection — and hopefully just in time; for our primary goal in the building of human settlements must be to retain the human dimension, in order that man shall remain in harmony with the world about him.

In this chapter, the first statements present the goal of our megalopolitan undertakings: the sacred preservation of human identity in the urban environment, because man is the measure. The statements that follow, offer certain key factors which must be kept in mind in building towards this goal.

3.1 Man is the Measure

*In the setting of ancient Greece, the pre-socratic thinker Protagoras declared with a profound simplicity rarely known in the history of thought, that “man is the measure of all things”. Hundreds of years later, **R. Buckminster Fuller** observes that*

*If all humanity attains planetary success,
Central to that attainment will be
The magnificently regenerative power
Of the Greeks’ intuitive
Synergetic spontaneity of thought.*

*(Fuller, R.B. Intuition, Anchor Press/Doubleday,
N.Y., c. 1973, p. 75.)*

Only in a retrieval of the essential meaning of “man as the measure”, will mankind be in a position to engage in the building of the authentic anthropopolis, the city for human development.

*It is **Panayis Psomopoulos** who directly and succinctly places anthropos at the centre of our megalopolitan concerns as he asks:*

Which are the problems at the megalopolitan scale?

They are the problems we have in all the other scales put together cumulatively — problems we have now and many more if we continue present trends. If we don’t change our general attitude to the basic principles, and systems of values, we shall never reach a habitable and liveable city of the future. We have now three and a half billion people on earth; we know we shall have seven billion people at the end of the century and we know that a substantial share will be located in this particular area of the Great Lakes Megalopolis. Who is going to cope with this and how? If the present situation is impossible and if we have no signs that we are improving in our handling of these problems, how can we hope that we shall have a liveable megalopolis in the future?

The first task is to study carefully the role of the environment and its impact on man, individual man, or man as member of various communities; to see what the problems are and to try to solve the problems or at least set the foundations for solutions to these problems now and in the future. That’s the first thing we have to do.

Dr. Margaret Mead reinforces the point that a human identity must be preserved within systems of settlement which only become more intricate and complex, as their problems accumulate in geometric proportion to their size.

When one talks at a macro-scale, it sounds as if everything was lovely in the garden, but we’re not considering the things we’ve done to human beings at all.

We are just beginning to understand, and the understanding has been growing over the last year or so, that when you raise behaviour above the village level, which is where agriculture resides, you automatically raise it beyond the level where you have participation of all the people and particularly women.

At the village level, men and women cooperated in the handling of food, and it didn’t make any difference whether the women had bones through their noses, whether they lived in polygamy, whether they were tattooed, whether their ears were stretched — the women controlled the preservation and distribution of the food, which meant that they controlled nutrition and they controlled storage.

But as we've graduated food up to the international level, people have completely forgotten that food is eaten; it's hardly used to eat today! It's used as a weapon or to make money and in some countries, half the food is lost today in storage. Why? Because over 90 percent of the Food and Agricultural Organization's research goes into producing a marketable commodity rather than into nutrition or problems of preservation and processing.

If we look for the human scale in the megalopolis, the only place there is any humanity left is where we've accidentally transferred something from a lower level; this lack of humanity is most conspicuous in food, but it is present everywhere. The shape of a door may still be the shape that you can get a coffin in and out. But all you need is planning in Washington of a two-storey housing project — only two stories and you get a stairwell that you can't get a coffin down, and you can't get a stretcher down; what will happen in planning 20 or 30 storey buildings?

Today people are sitting on chairs that weren't designed to be sat on; they're drinking tea out of teapots that won't pour; they're sleeping in beds that give them intolerable backaches. There isn't a thing that is devised for the users by the users; it's all devised by people who never use it and they don't know anything about it. The agricultural policies are now devised by people who know nothing about food, except that they eat it, when somebody else prepares it for them. To return our great aggregations of people to any kind of a human livable position, somehow we have to include the users in the planning, and this is not something about a poverty programme; it's a simple fact.

This is where we are: unless we can devise ways to humanize our enormous population, we are in serious trouble. We are producing populations that are unmanageable — whether they are the Red Guard in China who, once let loose, were so dangerous that they had to be subjected to extraordinary discipline when the party line changed; whether they're the three million "doorstep" children in the United States, which means three million teenagers, between the ages of 13 and 21, for whom no human being can be found who is responsible enough to sign a certificate for them to have their tonsils taken out. These are bombs, and they are bombs that are being produced more and more by the kind of city that the larger it gets, the more unmanageable it is.

No Faustian Pursuit

The statement has then been made: man is the measure. But its simplicity is apt to be misleading, for unless man remembers that the statement harbours a profound richness of insight, he may well be inclined to seek

encouragement from the Protagorean vision, in the modern selfcentred, Faustian-like pursuit of vainglorious ambition, sought at the expense of the far more essential long-range consequences.

In asserting the importance of the human scale in the building of our settlements, it is wrong to speak of man as if he can rightly pursue his own goals at the expense of other living beings, at the expense of the environment — indeed at the expense of the very world upon which he is so dependent, and to which he essentially belongs. It is important to remember that the moment man is considered in isolation from his world, he is considered in isolation from his very essence; and therefore, as Mr. Psomopoulos notes:

When we say that anthropos is the measure of everything, we are not speaking of anthropos in isolation from other broad ecological aspects. Our system must be revised, of course, in order that land uses, even at the neighbourhood scale, be defined on the basis of human energy, human time and the various other activities that are prerequisites for happiness. But Doxiadis recently proposed a system of organizing uses and he speaks about four categories of zones: the natural areas, the agricultural areas, the anthropic and the industrial areas. Our land uses and planning proposals should try to lean towards a global balance, not only of the anthropic ecosystem, but all the other ecosystems as well.

3.2 Building Anthropopolis

In view of the primacy of the human measure, the immediate task is one of actually constructing cities for human development — a task of constructing anthropopolis.

Clearly, the purely economic base in building human settlements is no longer sufficient. Nor is it — after generations of neglect — sufficient to speak of the human in merely one-dimensional terms. Professor Thomas Langan points out that the essence of man — indeed, the condition of all creativity of human building or of human thought — must be understood as a most primordial belonging-together of man and being.

To heed the call of being: this is not some kind of bad metaphysical joke, but rather a way of pointing out that even after you have provided all of the necessary and the apparently sufficient conditions for creativity, there still remains the extremely mysterious aspect of it. Certainly we may have a profound respect for creativity and a great desire to be creative; but there is no way in which we can get up in the best of humours some morning and then with a command of will say: "Today I am going to have an idea." Clearly, there is the serious business of receiving from the situation a call, in the form of a question and a "grace" — a grace not necessarily smelling

of overwaxed corridors and Jesuit colleges — not a divine grace, therefore, but a previous grace in the form of a gift of being. I'm talking about this extraordinarily mysterious business of seeing what the situation calls for — something which we cannot merely will, but which is offered in the form of a creative gift; and it is in fact those people who are favoured with such a creative gift upon whom we essentially depend to find our way out of the increasingly menacing crises in which we find ourselves in the current epoch.

Being at Home in Megalopolis

Professor Langan urges that, in our pursuit of many diverse goals in the building of a humane megalopolis, we do not lose sight of that most fundamental task which must in fact unify these diverse goals. This fundamental task, he suggests, is that man learn how to dwell in megalopolis, that is, that man learn what it means to construct a home, an authentically habitable place where he can be at home, where he can be himself, in a world dominated by nihilism and the "planetary triumph of an inhuman technology". Such a construction, Professor Langan shows, is essentially a kind of thinking, "the sort that could recover a sense from the tradition, provide an orientation in the midst of a world pursuing the gigantic and the infinitesimally small precisely because it had lost any sense of being, and discover for the individual who he is and in what sort of space he is called to dwell."

The pursuit of this most fundamental, unifying task necessarily will involve a rethinking of the essence of our technological society as a way of approaching the true essence of megalopolis itself — a megalopolis which is, after all and in a profound sense, given, but which it is our responsibility to understand and most creatively develop.

The megalopolis is a grace of being. With it, the question confronting contemporary man is writ so large, so exaggeratedly that it virtually forces upon us an awareness of the central problem of our time, which is not that of learning how to live in megalopolis, but how to dwell at all anywhere — how to be at home — in a time when change is accelerated beyond comprehension, when space is both exploded beyond the planet and imploded in a way which brings all the world's events into a dense mass centred in my so-called living room. The form the crucial problem of discerning what it means to dwell takes for us, to whom it is given to live in megalopolis, is just more dramatic and more pressing, but down deep it rejoins the problem faced by the uprooted tribesman wandering into the yet small capital city, or that of the bored teenager in the small prairie town whose home has become his old rebuilt car with which he tools up and

down Main Street. The same restlessness and lack of imagination are shown by the car cruising cowboy and the great bank president who can think of nothing better to manifest aggressively his uncertain "I am here" than to erect a square tower a few stories higher than his competitors' with the result that this latter-day St. Geminiano, Toronto, has become the laughing stock of the few who stop to think about the adolescent, insecure machismo such a carrying-on manifests.

It becomes difficult to fail to see that there is a problem about being at home when one is perched anonymously on the thirty-eighth floor of the Manu-Life Centre or banished to a postage stamp lot and super-Levitt house in outer Etobicoke. One begins to wonder about the question of a centre for one's life when he witnesses the effects of the perpetual round-dance of moving middle management or contemplates the number of kilometers a year the average bourgeois gobbles up, the energy crisis being a crisis of misplaced human energy wasted in the flight before being.

There is a certain peaceful dynamism in nature: the Heracleitan fire flames up and dies away with just the right combination of cyclical, dependable change and unexpected variety, the in-breaking of events. The man tied to the land enjoys this unending, somehow reassuring spectacle without having to go anywhere. He even enjoys the minor catastrophes, provided they are not too menacing — the spring overflowing of the creek, the muting blizzard, the tornado that tore through the woods. He does not have to go to the show, for the show comes to him. In the megalopolis, we have fixed it so that we can hardly even see the sky anymore, and even when we rise to a point where the horizon may be scanned, the sunlight filters through a copper haze of industrial poison. Anyone who has ever known the country, wants to go, to "get out". Everyone else, however, is condemned to learn to dwell in megalopolis. Is it even possible?

Cerebral Solutions

Let the most optimistic speak first. The thoughtful urban planner seeks a technological solution to a problem he believes was caused by technology. We shall deliberately create urban spaces and textures within which people can interact. First, we get the machines out of the way, cars are banished to the periphery of our artistically arranged space. Then we have to find something to go on within our anthropological preserve, something sufficiently attractive to draw like a magnet the restless machines so that they will repose a moment on the periphery and there disgorge their contents into the arena. But what? In Toronto, we have created a science centre, a zoo, an Ontario Place, an art gallery, a Yorkville and a Markham Street, all similar in their effect. Why do they not work, that is, why are they in no sense spaces in which anyone could possibly dwell, even if he wanted to, and

where no-one wants to linger, as one can for hours in the Grand Place of Salamanca or the Piazza of Ascoli Picena? Why does everyone just pass through and leave with the impression of having spent, indeed wasted time, but not of having lived? Why do we feel that we must “have fun” in such a place, instead of feeling that we are there to be ourselves?

It is far too easy to criticize; but we must do it anyway, hoping to learn something from the mistakes of these human wastelands. All of them are too cerebral, too much monuments to technique, totally lacking in spontaneity, in that depth and patina that come from the slow accumulation of human experience over the centuries. Megalopolis is in fact the product of instant, do-it-yourself civilization. No-one lives (in even the most minimal sense of the word) in any of our public places, so no-one is just whiling away time there, no-one just wanders in spontaneously, there is no regular gathering of friends, no built-in cross-section, everyone has had to decide to come, to gawk, to pass through, to leave again in a brief moment.

In the theatrical, marble paved Piazza of Ascoli Picena, the regulars shift from the cafes on one side to the cafes on the other, as dictated by nature: *l'ombra è tutta!* The garçons not only know all the regulars, they recognize you when you come back even a second time, and they always have a minute to exchange small talk across any linguistic barrier. One feels instantly at home as you sit on the metal, not especially comfortable but nevertheless gracious chairs, watching the evening shadows creep up the campanile of the Dominican Church and the squeaking starlings whirling and dashing after the last mosquitos of the day, and you enjoy all the town characters as they dissect the latest political imbroglios with decisive gestures and animated expressions. Nobody is trying to fill you up, get your money, and send you on your way: you are expected to linger over your rather expensive espresso and half-bottle of mineral water. As you have not had to pay to get in, as you must at Ontario Place or the zoo, you do not feel that you must get on with “doing something” in order to amortize your investment; nor do you feel that, given all the trouble to get across town, and the fact that you won't be back for another year, there is a compulsion “to see it all”.

There exists an old Christian tradition that man is not meant to dwell in this world at all. What mediaeval preacher would not find his direct predictions fulfilled by the spectacle of rootlessness, depression and exploitation presented by the citizens of megalopolis? Would not the rhythm — compelling, exhausting of the big city and its incomprehensible gigantism, with almost as many people living around the Great Lakes as inhabited western Europe in the twelfth century, present him with the picture of a satanic Babylon, a confirmation of what is bound to happen when man turns away from God to pursue mammon in the form of his own vainglorious power?

The tradition has a valuable warning to offer us: We must not take it for granted that dwelling is easily accomplished, ever, anywhere; loneliness, insecurity, the need for self-understanding and for support are aspects of the human condition, exacerbated to be sure, by the dimensions and conditions of the technological city. The megalopolis, we have suggested, is a grace of being: it forces us to inquire more deeply than ever before into the essence of being-at-home. There is no running away any more, the megalopolis has left virtually nowhere to go; and when we travel, we discover thousands of miles later that we are in a modern city so much like the one we left days before that we begin to realize that the sameness of megalopolis is not just a phenomenon of enormous population, but of the planetary domination of technology.

How to Dwell?

Although the negative effects of the domination of an inhuman technology arise within a metropolis, it is only within megalopolis that these effects so destroy the human scale that man is moved to take positive action in learning how to dwell. -

Dwelling is being managing somehow to be oneself. One is at home in the Piazza of Ascoli Picena, if only for a little while, because there is peace there, people are together, united by the bonds of culture, family, friendship; the buildings express great continuity in time; the space is generous, disposed as it is for human beings, on a scale which they can comprehend, feel a part of, be impressed by without being overwhelmed, as we are by our modern cityscapes. Resting there in Ascoli, we are privileged to participate, if only superficially, in a communal life that still enjoys considerable cohesion, where human things are not yet entirely subordinated to the abstractions of technology. Why does this invite us to put aside, if only for the last part of an afternoon, the flight before being? Why do we open ourselves to the surroundings, absorbing and being absorbed by the old stones, the whirling starlings, the mellow light, the people clearly enjoying themselves? Can certain spaces and the human dynamics they unfold and the history they express and the nature they espouse arouse in us an experience of being-one-with-ourselves through the mediation of these things? Is not the continuity of space-time-people-nature here expressed, an incarnation of that persisting, growing, fructifying, which the person in us naturally seeks? The tradition's warning that we are not meant to dwell in this world, contrasted with the witness of the islands of relative peace like the farm and the Piazza of Ascoli, together warn us that no combination of practical, common sense solutions to the problem of being at home in megalopolis will suffice.

Of course, planners must find ways to offer the city dweller easy contact with at least a little touch of carefully programmed “nature” (“green space”); he ought to favor the development of vital cores where “something goes on”, and move to protect varied neighbourhoods; above all, he must work to achieve rapid, comfortable urban transport that will allow people to get together more often, and spend less time travelling.

What good will all this do, though, if people still do not know how to dwell, if the problems of megalopolis are rather caused by, than causing, the deep unhappiness of individuals who are not at home with themselves, or rather what if the one feeds on the other, the unhappy people creating unhappy conditions which contribute to making individuals yet more unhappy? The only way to break such a vicious circle is for the individual to heed the call issued by the wasteland of industrial society to turn back to himself to search for the wellsprings of his ability to dwell. Our “dwelling places” must be constructed to fit our lifestyles, not vice versa, and our lifestyles, if they are going to permit any being at home, are going to have to be built as the result of our heeding the demands of dwelling as such.

What then is the essence of dwelling, and what peculiar demands does being in megalopolis — most obviously an important aspect of our particular situatedness — place on those human beings who must there achieve this being-at-home?

An important hint is offered by the opposite of dwelling: flight away from oneself which we found so easy to ridicule. But just staying at home is obviously not being at home with oneself. We have heard enough talk about people “trying to find themselves”. Discussions of what this involves are most often too narrowly conceived in terms either of vocational crisis or psychotherapy seeking to help a person face aspects of himself he is trying to escape in particularly destructive ways. These are important issues, but they skirt around the essential, positive question of finding oneself, as precisely a kind of making a home in this world.

What is at issue is a kind of wisdom. Obviously, certain vocations are wiser for a given person than others, and some, demanded by our industrial society, do not seem wise for anybody. Obviously, personality disorders place grave blocks in the way of any quest for wisdom, and so they must be removed. But the positive question remains: what is it to be wise, and how are wisdom and dwelling the same?

Dwelling as Wisdom

The first condition of wisdom is truth about oneself and about his situation, which are practically inseparable, truth in the sense of a generous, sensitive openness to what is going on within, without and all about. To know

what we can be, we must somehow discover the deep possibilities held out to us by our situation. The deep possibilities are never the most obvious ones, the enticements flashed at us by the crowd, by those who are interested not in our development, but in our exploitation. As we grow to awareness of ourselves, we find ourselves already deeply entwined in vast networks of relationships, often superficial, but yet involving, because of their complexity. On the surface, we are these roles we have allowed ourselves unknowingly to be formed to play and we are so busy running life’s errands, carrying out the surface demands of these roles and institutions in which we are involved that we begin to wonder if at the point of intersection of so many currents, there is anything left over that would be me.

The beginning of liberation from the mindless pursuit of all these thousands of little daily challenges that are preprogrammed by society for our automatic response comes at the moment when, as a kind of grace, it is given to me to realize that none of this has to be for me, indeed that all of it is absolutely destined eventually not to be at all, as death levels everything. The realization that these myriads of challenges are possibilities, rather than necessities, and that possibilities present themselves with a range of openness, so that we are not only responsible for choosing or not choosing them, but also for the cast it is to take on in being carried out; when we come to understand that becoming myself is a process of making my own those decisions which I had before been allowing to be made for me, then we see that the issue of the sense to which all those decisions add up has to be faced: not just where do we want to dwell and how, but what for?

This raises the immense question: What are the fullest, richest, deepest possibilities of our situation? When one understands that my “situation” is not just my own most personal and family concerns, but includes necessarily and essentially, not just the megalopolis in which the majority of men in industrial society already live, but that society itself, indeed the epoch which brings us the world crisis accompanying the planetary spread of our technological civilization, then the immensity of the quest for the sense of it all overwhelms us.

Indeed, an appalling spectacle is unfolding before us here: Is the philosopher seriously maintaining that the condition for the possibility of megalopolitan man’s being at home is a coming to grips with the problem of the essence of our civilization?

Nothing less will do: We must learn to appreciate the full dimensions of what is going on: it is planetary in scope, all-pervasive in penetration, and rooted deep in the tradition.

Hidden behind this truism is a whole program of education, one designed to prepare the children of megalopolis to live in it by helping them to perceive

their situation in it through enquiry in depth into the essence of this civilization. It would be childish to believe, of course, that any program of education, however successful in offering some sense of orientation through the scope of the deep historical understanding it would make possible, will of itself lead to wisdom. But I submit, such an undertaking is a necessary, if not a sufficient condition for the kind of self-direction in the midst of the powerful changes of which megalopolis is but one of the striking instances. Without such orientation, one would not understand the place wherein he is called to dwell, he would not know the dimensions of its true possibilities, and therefore he would not stand a chance of understanding for the sake of what and in terms of what he should seek to dwell. Indeed, the question in this form would not even occur to him.

At the same time, removal of damaging blocks to self knowledge is also necessary, requiring the solicitude of others who care enough to come to know us well and sympathetically. That is the vital importance of the little shreds of community which we have managed to preserve despite the ravages of megalopolis' neurotic life — the families that still work, the church communities, the little groups of friends who are still willing to brave the distances and the 40 cent fare to do things together. And for those who require it, the group therapy sessions and even the psychiatric institutes are available. Finally, the conditions of an individual's life have to offer some security, and some moments of rest over and beyond evening hours of utter exhaustion when one cannot drive himself to participate in anything more active than munching peanuts before the television. The person caught in the maelstrom of an 18 hour a day responsibility or depressed by having constantly to skate on thin ice, will not enjoy the minimal conditions for that kind of confrontation with oneself demanded by the wisdom of dwelling.

“Child of the gods”

For those fortunate enough to enjoy some security, a viable work load, a small community of caring friends, a psyche equipped with only minor complexes, and a mind furnished with the broad, deep and humane outlook offered by the best possible modern education, is being-at-home in megalopolis a genuine possibility? What concretely would authentic dwelling in our present setting require of this child of the gods?

Enter now the problem of actually constructing our abode. Why is a certain amount of willful, explicit construction necessary? Consider the crushing time bind that requires that we exercise the greatest clear-sighted good sense and self-discipline in order to make a meaningful dwelling possible. Consider

the constraints under which this most favoured individual will operate. If he has been wise enough to find a humanly enriching employment, then as it will be the kind of job in which he will have a responsibility for the well-being of others, seeing how colleagues have not upheld their part of the responsibility, he will respond to the call of duty by doing far more than what is contractually called for. Secondly, he will have discovered that the wonderful education we have postulated opens question upon question, requiring continued reading, researching, reflection. Thirdly, he will not be able to sit idly by while the community at large disintegrates. This means endless hours of participation in groups fighting to raise awareness and to thwart corruption. Even if he pares down the lost time of needless transport and fruitless running around to the barest minimum, will he have time for friends and family, authentic time, that is, when he is relaxed and truly available?

To dwell amidst the pressures of modern life and within the constraints imposed by the giant city, we must learn a contemporary art: the management of our time. The goal is to avoid dispersion and to achieve an intensity and quality of presence at the moments when it counts most, and to see to it that those moments have the dimensions — the endurance — humanly necessary for something to happen. This means establishing priorities and making a choice: some extremely worthwhile activities which deserve our participation and concern must be resolutely sacrificed: we will be no good to anyone dead and little good to most so spiritually dispersed as never to be really all there. This means blocking out time, some of it in generous chunks, the way we do that part of the year when we go on vacation and seek for a period to change our lifestyles considerably. The same thing can be done with a week: a time is set out for regular togetherness, of friends, of family; for reading and reflecting; for worship; it must be adhered to as fanatically as possible. We seek for forms that favour real communication, and resist parties and gatherings given either to escape reality or to pay off accumulated obligations.

But what in all this invites us, or better yet obliges us to confront the essential question, underlying the problem of dwelling: the question of the sense of it all?

Any combination of suggestions of impending doom spawned by a society that is fast gobbling up all the inhabitable space and using up all the available resources on the one hand and marvellous intellectual resources readily available on the other, does not guarantee us the courage and determination to pursue the question. Dwelling occurs only where there is a will to dwell: we cannot be at home until we want to be. The rest are all so many conditions: but all depend for their fruition upon the will to wisdom.

From Consumers to “Poets”

How then does man dwell? To our question, the German poet Holderlin answers: “. . . *dichterisch wohnet der Mensch auf dieser Erde*” — “poetically dwells Man on this earth.” There has been nothing poetical about our commonsense talk here concerning choice of vocations, depth of historical education, security, time-management, the importance of care by friends and family. But when we come to understand the meaning of *dichterisch* and of dwelling “on this earth”, then it will be clear that for all our prosaic talk, what is demanded by authentic dwelling is a poetic construction indeed.

For the poetic is the coming to expression of the genuinely creative: the poet is he who expresses being and therefore through whom being comes to be. By “the earth”, our poet expresses the totality of possibilities given in the situation into which we have been thrown. Being comes to be through man’s taking up possibilities and projecting them by his action into the future, thereby opening new possibilities. When we are doing nothing more creative than repeating mindlessly the possibilities society has put at our immediate disposition, without thought as to their deeper sense and without understanding our responsibility for their continuing, through us, to be, such calculative thinking tends more to use up possibility, to turn things stale, than to open new horizons of significance. Just as we use up natural resources, putting nothing but garbage back in their place (we call it “landfill”), so we use up language, wear out the social forms, exhaust the people whom we exploit, putting nothing back into our human landscape but spent existences. Hence the ceaseless fleeing before being — the true origin of the “energy crisis”.

Can the mere will to wisdom, the will to dwell, transform us from consumers into poets, from the users-up of imagination to creators of new possibility? Is the negative grace of the shocking and exhilarating spectacle of megalopolis enough? If not, if a positive grace in the form of a call of being is also needed, whence can we turn to hear that call?

One thing is certain, running away we shall never hear it. Trying to linger a while, to construct an abode for ourselves in the midst of the frantic city, to think back reflectively to the hoary roots of this civilization should station us there where we might be able to hear the echoes of that being which seems so absent from our Bay Street canyons and our “fun-producing” Ontario places. Without such a listening, all our ekistic expertise remains technological busy work devoid of ontological foundation.

Misconstructions of Abode

The lack of compassion shown in the actual building of human settlements suggests basic errors in some common understandings of the meaning and relevance of the human dimension in planning today.

An **Unidentified Observer** questions the responsiveness of past planning, to the most natural and basic needs of man:

Once when I went to an insane asylum in Wisconsin to visit a kleptomaniac, a little 80-year-old woman next to me was going to visit her only son. She was from a small farm outside of a new freeway. They were going to destroy her home. She had pictures with her, where she was married under the plum trees that her parents had planted. She was going to sit on her front porch and let them bulldoze her away because she wasn’t going to move. They had offered her \$2,000; she could have moved into a slum if she had wanted to.

We are asking the people to make inordinate sacrifices today, contrary to the basic needs of man. Mr. McLuhan has suggested that the Americans go home to be social. This was imposed upon the Americans; it is not something in the nature of man. You will find all over the country that all people of the same age want to do is to be together.

I lived in Nevada, and there the police were arresting the children for standing in front of the dime store, but there was no other place to go. To have fun is not a bad word like some people seem to say here. All the children wanted to be was together; so the end result was that they were arrested and a bond issue for \$500,000.00 was floated to increase the size of the Juvenile Delinquency Hall. For \$10,000.00 they could have bought two or three supermarkets and put people together. People do not want a metropolis or a megalopolis to run away from. They want one which will be a place to visit and stay. They need an area where they can go and retain their freedoms. When one plans for megalopolis, therefore, one has to ensure that the people make their own laws because there are too many people looking over our shoulders and making laws for us. Our concern must be to hold down the inconsiderate profit structure that makes taxes the important rule rather than the nature of man. I recall that they made a tax in Wisconsin against entertainment. (In order that people have fun, they had to have entertainment taxes.) Pretty soon everybody evacuated the taverns and went home; perhaps the big planners want us to stay in the home, with television . . .

Once, the city had an icon, which we thought was a flower. So when I was asked why I wanted to go to Japan, I said because I thought that looking at a

Japanese city was like looking into a rose and this is what the cities were, a rose; and the countryside and the little villages were dandelions.

The planners, I think, are the drawers up of the emperors clothes. Some of us realize that the emperor is naked; a lot of us, since we are not knights in shining armour, are the new breed, the new children that are long-haired and in tatters and we feel that we would like to have the clothes that are being thrown away.

Many of us loved and still could love cities like Chicago, or Milwaukee, or Detroit, but the buildings that were palaces have been destroyed and 30-storey condominiums have been put in their place, with slums two blocks away. Rather than exchange the slums and put these people in the beautiful palaces, we have destroyed the slums and left them there but also have destroyed the palaces. And I think that this is what the people in the countryside are worried about. We're taking something great and replacing it with nothing.

Mr. A. Abraham responds to these comments:

I think the young gentleman who had something to say ignored one basic fact and that is, true planners really provide people what people ask them for. I think it is not fair or reasonable to suggest that planners have provided the metropolitan area and planners will, whether we like it or not, provide the megalopolis. I think it has nothing to do with planners in that sense. Planners are those people we turn to and ask for direction.

It is easy for us to tear each other apart; but what must be our primary concern when we consider the Great Lakes Megalopolis is how do we put it all together so that it works not necessarily for us, but for those who will follow us. That is planning. Thinking ahead.

In thinking ahead, we must try to recognize the new constraints which are operative in an increasingly complex urban setting. The intricacies of technological advancement and the possibility of adequately predicting the particular form of such advancement, are discussed by Dr. Margaret Mead:

I am impressed by the number of new, unforeseen constraints that are operating and by the strength and distribution which they have. Probably the best bit of foreseeing technology was the protection of utility corridors. A utility corridor would not only contain the methods of communication and transportation we know of now, but lasers — of which we weren't quite sure what they'd do or how we'd use them, but they were mapped for the future anyway. The future of technology as an open-ended future, was contained in our planning; but what we did not foresee was the shape

that changes would take and the degree of dramatization that would be provided by the Arab countries' decisions.

Examples of unpredictable turns of events are all around us. Doxiadis' Detroit Study did not foresee a peculiar situation that is now occurring in the United States, that is, a coalition between the people that are worried about the proliferation of nuclear generators, especially the liquid fast-metal breeder and the plutonium enrichment programme, and the people that are mad at power companies.

In New York City, everyone has been saying "Ah, pretty soon you won't grow any more" — and we aren't. But no-one foresaw that within the management of the energy crisis in the United States, which has been maximally bad, you would have an irritability develop in the entire citizenry against the power companies, an irritability which the citizenry would express by telling the power companies that they can't build generators; there are now about 1,400 active groups all over the United States, fuelled by such annoyance. Dr. Hatcher said there was a relatively unimportant incident on Pell Street that provoked the Detroit riots, although the Detroit riots were totally predictable. But no-one predicted the riots because Detroit was the place where black people were doing the best in the country and no-one realized that when you're doing the best — and not when you're starving to death — is when you make the most trouble.

So we are now having a ferment in the United States that has been a by-product of the way the energy crisis occurred in the world, the way it was managed in the United States, the coincidence between the attempt to spread the liquid fast metal breeder and plutonium enrichment right around the world, which has been tremendously accelerated by the energy crisis, the mismanagement of the tax and rationing situation and now you get a new coalition of people that we simply would not have predicted.

What I'm trying to work on here is: What are the predictable human elements? What are the unpredictable human elements under which we are working? In the past, we came to realize what the resources of the planet were and how we had to use them, and what the limits of technology were — but the basic assumption was still we could do anything with money. What was needed 10 years ago was the appropriation of money to get something done: we could build a decent rapid transport system if we could just persuade somebody to put the money in; we could transform the food producing system in the world if we just had the money; and if we had the money and further technology, all tropical Africa would look like the plains of western Canada.

But today, we're facing the fact that money isn't enough, that we have to begin to think in other units, like the useful and well-defined ekistic units.

So we have new constraints, and one of the great advantages of having the definition of megalopolis is that we can place the new constraints that are introduced by the energy crisis or the population crisis or the food crisis in a new perspective.

Growing up for Megalopolis

Dr. Reginald Lourie's concern centres around the effects that these new perspectives and horizons of megalopolis will have upon individuals who are not raised from the start in a way which would help to adapt the individual to such horizons:

My mission today is to share some thoughts with you about how to raise human beings so that they can fit into a world that has been created for them with much broader horizons than they have had to deal with in the past.

We have to realize that certain basic needs of the human organism will be the same in the megalopolis as in the village or town or city or metropolis, but that they will have to be looked at a little differently when we change the horizons. Survival will always be in the picture. Satisfactions from relationships, the picture that the individual has of himself in relation to others, the productive use of energy, aggressive energy, pleasurable energy, the development of value systems, all will be necessary wherever that individual functions. To understand these basic needs in the megalopolis, we must consider them in the three main phases in the developmental process.

The first phase is defined within the family, in the first five years of life; the second is constituted within the neighbourhood, essentially between the ages of 6 and 12; the third begins in adolescence, as one learns how to become a citizen of a much larger community.

I have become more and more convinced that in order to make it possible for the individual who we are raising, to fit into the broader horizons of megalopolis, the first five years of life are for us the most important, since the problems faced in the earliest phases of development are the key to whether an individual is going to be capable of adjusting to the larger horizons. For example: before the end of the first year of life when hopefully dependency and the ability to relate to others has been established, there begins to be a separation, a moving into a little bit of independence. With that comes fear. That fear has to be resolved if the individual is to be able to function in the larger scheme of things; if it is not resolved, an individual is doomed to remain in a constricted kind of environment.

This process of separation might be compared to the problems faced by a baseball player. Take the case of a baseball player up at bat, who gets a hit and gets on first base; who takes a lead towards second base, only to find

that he is forced to return to first base — and in a hurry. But suppose that as he gets back to first base, the base isn't there: some individuals will keep hunting for that base and when they find it, they'll stay on it and won't leave it. That is the constricted horizon, when an individual comes to be convinced at a certain age that he has to stay close, that he can't expand his horizons. There are some, of course, who give up the game entirely, and those are our casualties, our psychotic children. The ones who know that there will be a resource available, that there is a base when you need it, are the ones who can then proceed to the next stages of development. This is just one aspect, then, of how important the first years of life are.

In fact, in order for the individual we are raising to be able to function in a much more complex community or megalopolis, we need to raise individuals who have flexibility. The rigidities that can develop are great hazards to being able to function in the megalopolis. Those who can learn how to function by more than one standard are well-prepared in contrast to those who remain keyed to one small set of values.

So the whole question of the picture of oneself in relation to others begins in these first few years of life. If we try to trace the major problems that face our communities today, to their beginnings, we are led to ask when the first answers to certain questions come. When the child looks at himself and asks the questions: Is black or white or red or yellow good or bad? Is it beautiful or ugly? Is it clean or dirty? — the answers come first at two and three years of age; and if we are to deal with such problems as racism and prejudice in terms of their foundations, the first developmental phase is where we have to concentrate our energies, on a preventive basis.

This is where schools have a large role and one of the increasing roles they will have in the megalopolis is dealing with cultural differences; of being able to adjust this concept of multiple standards to cultural differences; of being able to adjust the concepts of nationalism, loyalty to the group to a kind of trans-national concept, so that an ability to adjust to "them", as well as hold one to "your own" is fostered. For if individuals are to function in these larger urban systems, they will have to have, in addition to broader perspectives, broader tolerances as well.

In short, as we develop our urban systems to the scale of the megalopolis, there will have to be more and more a community approach to meeting the needs of the children and in those countries where this has been recognized, they are producing the citizens who fit into their social systems, into their communities and who become their most devoted citizens and productive citizens. This is true for example in the Soviet Union where our colleagues have told us that it isn't true that they are a classless society: children are their privileged class. It's true in Israel where the pioneers in the development

of settlements had great attention brought to the children and child rearing in the Kibbutz; the Kibbutzniks have now become the backbone of the Israeli army.

Popularly seen to be one of the most overwhelming aspects of larger forms of settlement, is high rise living, and its alleged non-response to primordial human needs. Dr. Margaret Mead notes that:

The newest fad in the United States is the fear about being above the fifth floor — a fear which insists that it is inhuman to be above the fifth floor, that people in high buildings get all sorts of mental and physical diseases. But it is only the poor who get these diseases; you'll never get them if you're rich. It's peculiar because it's one of the few cases where you can show that the rich are immune from things which we treat as physical, which is being above the fifth floor. The richer you are, the better you do in a penthouse, and the poorer you are, the poorer you do above the fifth floor.

Current reaction is prone to take only the negative aspects of high-rise building seriously, but Mr. Bill King offers an example of efforts of one segment of megalopolitan society to foster and develop a spirit of community, quite unique to high-rise living projects of North America.

No matter what building is done in Toronto in the next 10 years, two million people are going to live in the buildings that are already here. It doesn't matter what gets built next, most people in Toronto 10 years from now will be living in buildings that exist right now; and so maybe what we should be looking at is not how you design new environments for people to live in, but how to make existing buildings livable.

Over the centuries, we have learned quite a bit about how a nuclear family can live in a single dwelling. We have had centuries to work on that but we have not had much time to learn how communities can live in high-rise buildings; how people can live in buildings where there are from 500 to 1,000 people in a building with most of the people not knowing each other.

There has been for the last seven years in Toronto a laboratory which has been trying to work out those problems. It hasn't always seemed like a laboratory: sometimes it seemed like a building full of hippies; sometimes it seemed like the drug capital of the world. It seemed like a lot of different things. One of the primary things that has been developed is a community in a high rise building where everyone knows one another.

We have our own services, our own day care centre, our own newspaper, our own grocery store, two restaurants, our own maintenance service. We know how our elevators work because the people who know how to work the elevators have taught us. Everybody in the building knows how to

put out a fire himself. They know how to work the fire hoses and there is a problem with fires above the fifth floor but then there is also the fact that if there are fire hoses on every floor, you just put out the fire yourself.

We have been self-governing throughout all of this. We had no precedents at the beginning and it helped us in discovering these things. We have learned how to develop a way of administering a high rise building so that it is not even inconvenient when people move on the average of three or four times a year without leaving the building. You can work that out if you have a need to do it. If your friends need to move around, you will find a way to set up a bureaucratic structure that can cope smoothly with the fact that your friends move around.

But despite all this, we have counted 83 servants of the system — lawyers, judges, police, rent collectors, bankruptcy administrators, clerks, management consultants, and others — who work 7 hours a day, 5 days a week for the sole purpose of having us evicted . . .

Holistic Approach

Margaret Mead concludes that, if properly utilized and carefully controlled, the megalopolitan framework offers new possibilities of broader and more comprehensive consideration of urban issues, and offers in fact a new opportunity to understand the total system in a way which was impossible in the past, when man has sacrificed a holistic approach to problems of urban settlement, to more specialized single purposes.

We are dealing with a man-made environment; and I'm taking the word "man" here not to mean man including woman, because women have never had any part in it. There is no feminist need to include the word "woman" in a man-built environment, because it's been built by men, ignoring almost all the users, i.e. women (that's 50 percent — sometimes more) and most of the ordinary workers of the human race. The workers' hands have helped build it but they never planned it.

The man-built environment has been built by few people and with major single purposes in an attempt to maximize not the sort of thing that statistics say you have to maximize, but to maximize power or profit or prestige or protection — the four "p's". Right through human history, our building, our man-built environment has followed single purposes that were almost always destructive to parts of the total system, either to the environment or to the human beings that live within it.

But recently, there has been a movement toward an understanding of the whole of man, with what we have learned of our planet, the solar system, the universe. We have available ways of thought which do not make our

lives purposeless but give us a clear responsibility for the preservation of that system which we now have the possibility of destroying. We do not know on what scale but we certainly do have the possibility of destroying the planet and so our new responsibility is one which can only be religiously conceived on an even wider scale than in the days of our great saints and prophets.

We have learned at last that small groups are part of the larger groups; we can love the whole but only if all the steps are in, and at present a lot of the steps are left out: the family has too rigid a line around it, the nation's state has too rigid a line around it for us to be able to make the transformations from the small group to the global group.

But we have an opportunity at a wholeness that we have never had before. We have lived in a fragmented world up to the present time, that we knew a little bit of and a little bit more of and a little bit more of. We know a great deal more today, though, and it's on the basis of that wholeness that we can now draft our planetary system and also deal with the fragments.

Dealing with these fragments in building human settlements will involve a discerning appreciation of the parts as well as the whole; therefore, as planning takes on an international scale, and as planners from one culture increasingly participate in the building of settlements of other cultures, Margaret Mead makes clear that the holistic approach to urban problems shall not mean a uniformity of approaches, but rather a necessary unity among a rich diversity of needs. She offers an example:

When we were trying to work on refugee feeding after World War II, instead of analyzing ad nauseum the food practices of the country, you took your new supplementary food, and you got some cooks from the country and said "Cook it"; chances were that if you let them cook it, they could produce something edible.

The only possible way to plan on an international scale is to have everybody there and thinking — to bring the nationals of the country into the planning from the start, and only then try and produce an abstract solution.

A Place We Might Love

Will it in fact be possible to concretely establish and/or retain basic human values within large settlement systems? Is it really possible that we reconcile the largeness of the megalopolitan system with the identity of the human individual?

Dr. Thomas Howarth offers an optimistic outlook as he considers the example of Ottawa:

It is possible to generate the love of place which is absolutely crucial to well-being.

I would urge the members here to look very hard at what is happening in Ottawa because we are again in the process of transforming a town into a capital city. We bridged the river; we are combining two national groups, the English and the French; we are bringing together 67 different varieties of legislative groups and we are making a livable and elegant city in terms of its functions. This is quite easy when you are dealing with a relatively small area, because we are linking Gatineau Park which is one of our great provincial parks, to downtown areas, by bicycle paths and small paths.

But I don't see any reason that we can't extend this to the megalopolitan scale. I would think that with great care and attention to human aspects, we could make even our Great Lakes Megalopolitan area an attractive place and a place we might love.

4 The Great Lakes Megalopolis

What then of this organism — the Great Lakes Megalopolis? How well can the generic issues discussed in previous chapters be related to a specific existing system? Can the urban system that is laced between and around the Great Lakes now be better understood?

The preceding chapters have dealt with the concept and its characteristics, its place within the larger urban and global systems, and its potential to not only serve but to enhance aspirations for a richer, more meaningful life.

It will now be useful to consider the Great Lakes Megalopolis specifically, through presentations of research findings on constituent elements of the GLM. The nature of these investigations varies in texture as well as in scope. However, the researchers have, in the course of their work, already met with a number of issues isolated and discussed at the Symposium — the presentations are therefore not only descriptive, but in some cases at least, prescriptive as well.

It is of paramount importance that the Great Lakes Megalopolis be properly placed into several spatial/functional contexts. **R. Buckminster Fuller** considers the existence of a large and important ekistic formation around the Great Lakes, within its continental and world contexts. He suggests that the GLM has a functional role in the Americas and in the world as a whole, that is akin to **Gottmann's** interpretation of megalopolis as a National hinge. His principal observation suggests a need for a broad, multi-dimensional understanding of the importance of the GLM to the rest of the world.

This global perspective is followed by **Constantinos Doxiadis'** outline of the needs and constraints within the GLM — an analysis based on 15 years of investigation and synthesis. In his typically systematic way, Doxiadis provides a view of the "total situation" and the two major issues that form the most complex ekistic duality: agricultural versus urban development. The quality of life in the future GLM depends on whether or not this apparent dichotomy is ever to be resolved. However, the real dilemma, suggests Doxiadis, is not growth, decline, resources, etc., but the degree of flexibility that becomes incorporated into a conceptual approach towards understanding the GLM, and the policies and programs that will make the megalopolis a truly human system of settlements.

The second part of this chapter consists of presentations by several researchers — both academic and professional consultants — of the studies on constituent settlement systems within the Great Lakes Megalopolitan chain. Although the scales of investigation and the specific research methods are not at present common to all, these studies nevertheless examine the

status and the behavior of a highly complex, dynamic and functionally interconnected urban system in the Great Lakes Region. The summaries presented, provide the base for the concluding part of this chapter in which the dangers facing the GLM today and in the foreseeable future are outlined.

4.1 Importance of the GLM

The degree of importance we attach to GLM is greatly affected by the limit of influence we believe it has. **R. Buckminster Fuller*** delineates just how broad and high that expanding influence really is; and in the process, gives an example of the kind of comprehensive thinking that is necessary to tackle systems of the size and complexity of megalopolis — let alone ecumenopolis.

4.1.1 GLM: Continental Hinge of Global Importance

My father was in the leather importing business in Boston. He imported from Argentina and India. The quickest he could get to Buenos Aires from Boston, or that the mail could get to Buenos Aires from Boston was two months. And the quickest he could get to Bombay was in three months. And at the turn of the century when Kipling said "East is East and West is West and never the twain shall meet", nobody thought that this was anything but the obvious. Suddenly this is no longer even mildly obvious and Kipling is almost forgotten. There has been vast increase of this type of information coming in and yet people are saying in advance, "I don't think any such thing is going to happen so soon"; but the minute it happens, everybody says "I knew it all the time." I expect that it is this strange ego or vanity that makes people convince themselves that they are not remiss and unexpecting.

I am going to show you a few graphics. Figure 10 is called the "world-map" — the kind still sold to school children all around the world. But it is a poor map, as our knowledge and our experience are not reflected in it: Greenland is several times larger than Australia, which is not the case; and one part of U.S.S.R. over on the left hand side seems to be twenty-five thousand miles away from the other part of the U.S.S.R., and they are only next door. This map was perfectly useful in the era of our east-west sailings and in that the lands were all separate masses and the waters were interconnected.

When I began to be interested in world studies, I wanted to be able to see the whole earth at once, and I wanted to have little distortion of the

*R. Buckminster Fuller of University City Science Center, Philadelphia, Penn.



Source: Urban Affairs Canada

Figure 10 Standard World Map: Mercator Projection



Figure 11 Water-Ocean-World Centred on Antarctica

Source: R. Buckminster Fuller

amount and shapes and sizes, so I found a mathematical way of doing that. This map is not familiar to you (Figure 11). It is a water-ocean-world with the Antarctic in the centre. We see that 85 percent of the dry land is north of the equator, so 90 percent of humanity lives north of the equator.

I call this map the British Empire map, because in the southern hemisphere the great jet stream goes unimpeded around the Antarctic and we have both the waters and the winds going around the Antarctic faster from west to east than does the earth itself revolve. So we have what is called the Great Roaring Forties down south there. You would be able to sail along because that wind goes quite rapidly from the Pacific into the Atlantic, and equally rapidly from the Atlantic into the Indian Ocean. When discovered, this merry-go-round became the really quick way to get from one ocean into the other, and this is really how the British Empire came about! The British traders and their navy got into the southern tip of South Africa, they got into Australia, New Zealand, and South America. They sailed utilizing the merry-go-round, and the people living in the Northern Hemisphere were utterly unaware of the control patterns. That is why this matter is so unfamiliar to you. But it was not unknown to the builders of the British Empire.

The new sky-ocean map was suddenly one continent in one world ocean. Instead of having the ocean as the centre of the map, it had the land at the centre of the map. On this map, which is completely North-South, we found that due to a 90° change from the East-West flow to a North-South flow, 90 percent of humanity could reach each other by the shortest air routes, without going near the Atlantic, Pacific, or Indian Ocean. It was an entirely “over the pole” affair — an arrangement which is not as yet taken advantage of by humanity to any important degree but that is the way the orientation now is.

Canada’s New Centrality

To the right-hand side of Figure 12, is what we typically call the East. In the upper left, is what we typically call the West. We have in North America only seven percent of all humanity. You see six light dots in South America and Central America. The other 56 percent is in Asia. They come so close together, that the lights seem to run together somewhat. This is really the big pattern of humanity, the one we have to think a great deal about today.

We see the people in the first map, completely deployed from one another; their lives were then inherently divided. They organized themselves around the world on the basis that they were divided, and weren’t going to see other people. They were fundamentally separate communities.

Suddenly we find that we are going to have an air age and an electronic age. Here is this North-South thing, and all the people that were those dots of light are all suddenly concentrated; and this is simply the largest pattern of megalopolitan development.

Much about our megalopolis goes along with an important visual thing that is going on, and I do want you to think a little bit about this. This situation that you are confronted with, where Canada which used to be to the North of the East-West waterworld and railroad world, suddenly is right on, because it is the highway between the continents, and it is there that the great percentage of humanity lives — 87 percent right overhead of Canada: in China, Russia, India, there they are. So Canada is going to come into a new kind of play in world running. I find the Buffalo-Toronto area beginning to pick up in a powerful kind of way. Its power is the North-South axis coming in to take precedence over the old East-West.

Looking at the population distribution map, one can really feel the relative loneliness of the Americas. This is an enormous graph of all the human beings to the North. Having been originally divided, suddenly and unexpectedly, we are all integrated, and whether we like it or not, the big integration is now North and South over the pole. It is one reason that Canada is becoming more and more important. In the East-West world, it was just a little too far North, the St. Lawrence goes up and it’s just a waterworld. And it was just a little out of the big swing. Suddenly, it is absolutely the main swing — the new crossroads — between both the Americas where 13 percent of the world lives, and the rest of the world over the pole and immediately to the North of Canada, where 87 percent of humanity lives.

4.1.2 The Total Situation

Constantinos, Doxiadis sends through his paper a powerful and lucid message on the present state of major issues within GLM, based on his systematic analysis of past developments. He then sets the tone of the rest of the chapter with a look at the particular needs and constraints that are proving to be formidable hurdles for the realization of balance in the GLM.

The Great Lakes Major Region, which includes Lakes Superior, Michigan, Huron, Erie and Ontario and the plains around them, is the most important development area in North America, for the following reasons:

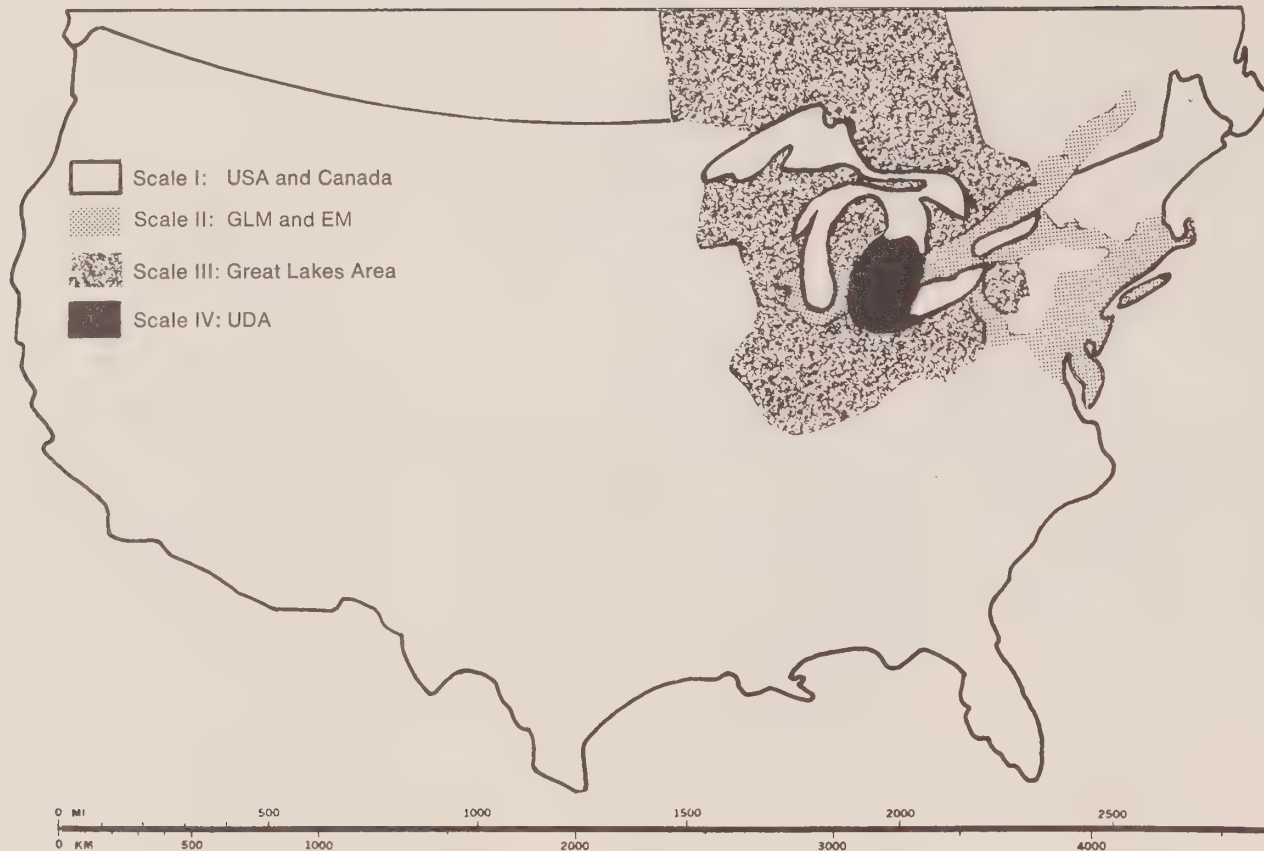
- 1 It has the best combination of large resources of water and land.
- 2 It has the best connection between the most important Canadian and USA development areas.
- 3 It has the best and shortest transportation (land, water and air) and communication connections with the other areas of North America.



Figure 12 **World Population Distribution**

Source: R. Buckminster Fuller

Figure 13 Great Lakes Major Region



Source: *The Developing Great Lakes Megalopolis Research Project*, Doxiadis Associates International

For these and many other reasons, the Great Lakes Major Region contains a population (75 million) which is larger than in any other region in North America and more than any European country. Although it has recently not been growing as fast as some younger areas, it will remain the foremost area of North America in terms of population, incomes, production, etc.

We can observe a tendency for greater cooperation between neighbouring areas, all over the globe. This tendency will strengthen the Great Lakes Major Region, as a connecting link between the USA and Canada.

Conclusion

The Great Lakes Major Region is the most important area in North America; it will remain such and its role can increase enormously (Figure 13).

Agricultural Development

An analysis of agricultural productivity demonstrates clearly why development started in this region, why it continues at present, and why it will continue in the future; as this area is the only one with a great agricultural potential over such a large area.

Globally, the need for food production will increase more than 4 times that of the population. This means that:

- 1 Areas which have recently been abandoned by agriculture for many reasons will have to be re-examined.
- 2 The cultivated area in the Great Lakes Region will increase once again, although, as in many other areas of increasing incomes, it has been decreasing over the last 30 years.
- 3 Areas with high agricultural production are going to become even more important than major industrial areas.

Conclusion

The importance of the Great Lakes Major Region will increase because of its agricultural potential.

Urban Development

A study of the areas suitable for further urban development gives further evidence that the Great Lakes' coastal area of Lakes Erie and Ontario, a huge area extending south and west of Detroit, and a large area along the St. Lawrence Seaway will more and more become the centre of major developments in North America.

Such a great potential for agricultural and urban development in the same areas means that:

- 1 Both agriculture and industry can increase their potential for development for many reasons such as easy interaction between the two, and its attraction to workers who can easily live in cities and work in agriculture, etc.
- 2 The urban population has the advantage of being close to the cultivated areas.
- 3 These advantages, however, create a problem of great conflict between urban and agricultural land use. This conflict, which is already apparent, will increase enormously.

Conclusion

While the juxtaposition of land for agriculture and for cities is a great advantage for both, it also presents great dangers of conflicts of land use.

Future of the Great Lakes Major Region

A thorough analysis of the many phenomena related to the urbanization of the Great Lakes Major Region shows that the process of growth — village, town, city, metropolis, conurbation — is continuing to form a megalopolis initially, then a megalopolitan system, whose extent we can measure, since human settlements follow certain general principles and laws.

The natural and inevitable urbanization of the Great Lakes Major Region results from geography and human interests in maximizing potential contacts by minimizing effort in energy, time, and cost. These are leading to a Great Lakes Megalopolis System, along the lakes and towards connections inside the plains.

This Great Lakes Megalopolis System will have its U.S.A. part, and its Canadian part. The life of the people will depend on their social and physical conditions at all levels, from neighbourhood to megalopolis. This means that theories supporting only one type of urban unit have no validity because society is gradually building a complex urban system with increasing interdependence between all levels.

Most of the smaller units are being studied by their local authorities. Here we concentrate on the total Great Lakes Megalopolis System, the city of the future, of which nobody is in charge.

Conclusion

The on-going changes in the distribution of the population of the Great Lakes Major Region will naturally and inevitably form the Great Lakes Megalopolis System.

The Real Dilemma

There is no doubt that only an organized expansion leading to a successful Great Lakes Megalopolis System can save nature and people in the best possible way. The big question is what kind of organized expansion is best. To answer this question constructively, we must conceive the total number of good alternatives, classify them systematically and then select the best.

Such a test effort has led to the following preliminary conclusions:

- 1 No single theoretical approach can really serve the entire area. For instance, the new towns approach can lead towards good solutions in specific cases, but it is completely excluded over the whole Great Lakes Major Region scale, because even by the year 2000, it would spread the area of urbanization too much and become expensive.

At the same time, it would not solve any of the problems of the existing cities.

- 2 No single overall plan can be implemented because there is no authority or group that can handle it.
- 3 The only alternative which can really help the whole area to develop towards a desirable and feasible megalopolis is to give each of the urban systems and rural areas a maximum of possible choices for their own plans.

4.2 Emerging Megalopolitan Patterns

*Having identified the importance of the GLM as a continental hinge of global importance, and the importance of the GLM to its inhabitants, further understanding of this megalopolis comes through presentations of studies of the entire system — first, a summary statement by **J.G. Papaioannou** — and then of the three constituent subsystems of the GLM: The Urban Detroit Area, the Northern Ohio Urban System, and the urban system stretching along the St. Lawrence down to Detroit, largely, though not entirely within Canada.*

*The first paper on the entire Great Lakes Megalopolis system, summarizes many years of research by **J.G. Papaioannou** and **C.A. Doxiadis**. This research was started within the framework of the Urban Detroit Area Research Project in the midsixties and was taken over at the conclusion of the UDA Study by a non-profit research group, The GLM Research Project Inc., based in Ann Arbor, Michigan and affiliated with Doxiadis Associates International and the Athens Center for Ekistics. **Papaioannou** has studied megalopolises throughout the world to a varying degree of detail and has continually sought to arrive at the synthesis of their basic characteristics, largely through comparison. His study has resulted in successive models in megalopolitan structure, the most recent refinement being presented in Chapter 1. **John G. Papaioannou** describes below the entire GLM system within the framework of his most recent studies.*

4.2.1 The Vast System: Present and Future

If we are to properly understand it, it is essential that we attempt to at least outline the evolution of the Great Lakes Megalopolis (Figure 14). We have various main conurbations; Chicago-Milwaukee, Detroit-Toledo, which goes up to Port Huron and Sarnia, and another one from Cleveland to Pittsburgh. These three are interrelated and they were the first part of the Great Lakes Megalopolis. In fact, the first formation which took place in 1960 extended

only from Detroit to Pittsburgh, and then, according to our calculations, in about 1965, it became unified in one main system, extending from Chicago-Milwaukee down to Pittsburgh in the United States.

Megalopolis Canada

According to the same calculations, the Toronto-Detroit branch was added around 1970. This megalopolis consists of two conurbations: one comprises Detroit-Toledo up to Ann Arbor and Port Huron and Sarnia, and contains about seven million people. Another conurbation around Toronto has some six million people and extends from Newcastle to Toronto and then continuously to Hamilton and to St. Catharines, Niagara Falls and Buffalo. This is the so-called “Golden Horseshoe” area, which in the north, has also reached the southern part of Lake Simcoe. Another million people live in between these two conurbations of the Great Lakes Megalopolis system.

The Canadian branch is a typical example of a megalopolis formation. London, at the middle of the centroids of population, was a city growing at a rate second to Toronto in 1950-60, and then it started growing much faster having by now reached a rate of growth of 58 percent. Between 1960 and 1970, London was the fastest growing city in this whole area which is exactly what the confluence theory of megalopolises would predict since it is located in the middle.

If we examine this entire area according to the Central Place Theory, the centres of the various regions appear to add a certain amount of impetus to the potential for London's growth — a point of confluence of the two conurbations. This may well be a factor increasing and strengthening the emergence of the Great Lakes Megalopolis-Canada.

Searching for the Confluence Phenomenon, there are intermediate formations as well, like Kitchener-Waterloo halfway between London and Toronto. Something similar is happening on the other side of London, in Chatham, halfway between Detroit and London, which, according to certain predictions, will soon be connected with Sarnia, providing another confluence example.

Other Links

Of the 14 million people in this part of the megalopolis, 8 million are in the United States — Detroit and Buffalo — and about 6 million are in Canada. We anticipate that by 1980, the GLM will have a connection leading to Cincinnati, and to Louisville, Kentucky. Already in 1975 the interconnection with St. Louis has been achieved according to our projections, and later on in 1985, we expect there will be a connection with Indianapolis. Around

Figure 14 Evolution of the Great Lakes Megalopolis



from: J.G. Papaioannou



1980, we expect another interconnection to take place between Cleveland and Buffalo; later on in 1985, this may reach Rochester and in 1990, it will interconnect between the Great Lakes Megalopolis and the Eastern Megalopolis of the United States, through the valley of the Mohawk River down to Albany and New York. This is a crossing of the mountain barrier there, which is expected to become possible towards the end of the century. We expect another branch to become megalopolitan, the one leading from Toronto eastwards to Kingston to a conurbation of Ottawa-Montreal reaching Quebec City a bit later. At the same time, the extension from Chicago and Madison to Minneapolis is expected to take place around 1990.

The axis of the megalopolis running from Detroit to Toronto follows more or less the direction of highway 401, passing through London. There is another axis which may become important in the future, if, as predicted, an important centre develops close to Port Huron.

Management of Directional Growth

As we see in a schematic presentation of megalopolis (Figure 15), it is quite possible to establish large green areas between the urban centres, so that there is a buffer that prevents continuous build-up along the axis of the megalopolis. Around each urban centre, there should be enough space so that each such centre would have ample space to develop and would have at least one direction in which to grow according to the Dynapolis Principle. I would dismiss the use of any "green-belts" around the centres, as the belts are constricting in all directions, are eventually and after considerable expense over-run and disregarded. They simply do not work.

At some future point, it would be desirable to have another "boundary" further out from the limits of the physical boundary of the megalopolis itself, so that one would have a slightly bigger area in which a megalopolitan authority could be established, if we ever reach such a point. Pending this, one could, for the present, have a cooperation of these areas' administrative units dealing with megalopolitan concerns, but I think we have to hope that at some future point, a unification will take place around each megalopolis, so that it can be properly governed.

Ecumenization

If larger megalopolitan systems are arranged according to a grid, then we can have in between these large systems, broad areas of green — of preserved nature — either for rural purposes or for recreation; or simply to keep nature as it is, while interconnected with the internal green spaces within the megalopolis in a way that would make the whole thing breathe. That would

make reality of what Doxiadis has called "ecumenoekos", a counterpart of ecumenopolis. Ecumenopolis is the future built-up, discontinuous area of the world, embedded in a continuous universal garden, ecumenoekos.

We have already started building the ecumenopolis, by developing the present megalopolitan systems. I think it is useful to keep a more generalized grid in mind in order to ensure that megalopolises develop along the principal lines and axes of these grids and that the main centres would be placed at the correct location for development. At the same time, that would help us to control the megalopolis internally, so that it would form an advantageous method of settlement, leading towards a humane ecumenopolis.

If we achieved this, we would then combine the great advantages that megalopolises offer today, i.e., the advantages of innumerable choices and opportunities, contacts with other people, institutions, jobs, cultural activities, entertainment, services — advantages for much increased mobility and freedom of movement within such a system — while reducing confusion and complexity and environmental difficulties. I believe that in spite of the difficulties ahead of us, it is possible, if one seriously considers the megalopolis to develop a system of controls which will be able to guide it towards a better human settlement than we have today in the Great Lakes area.

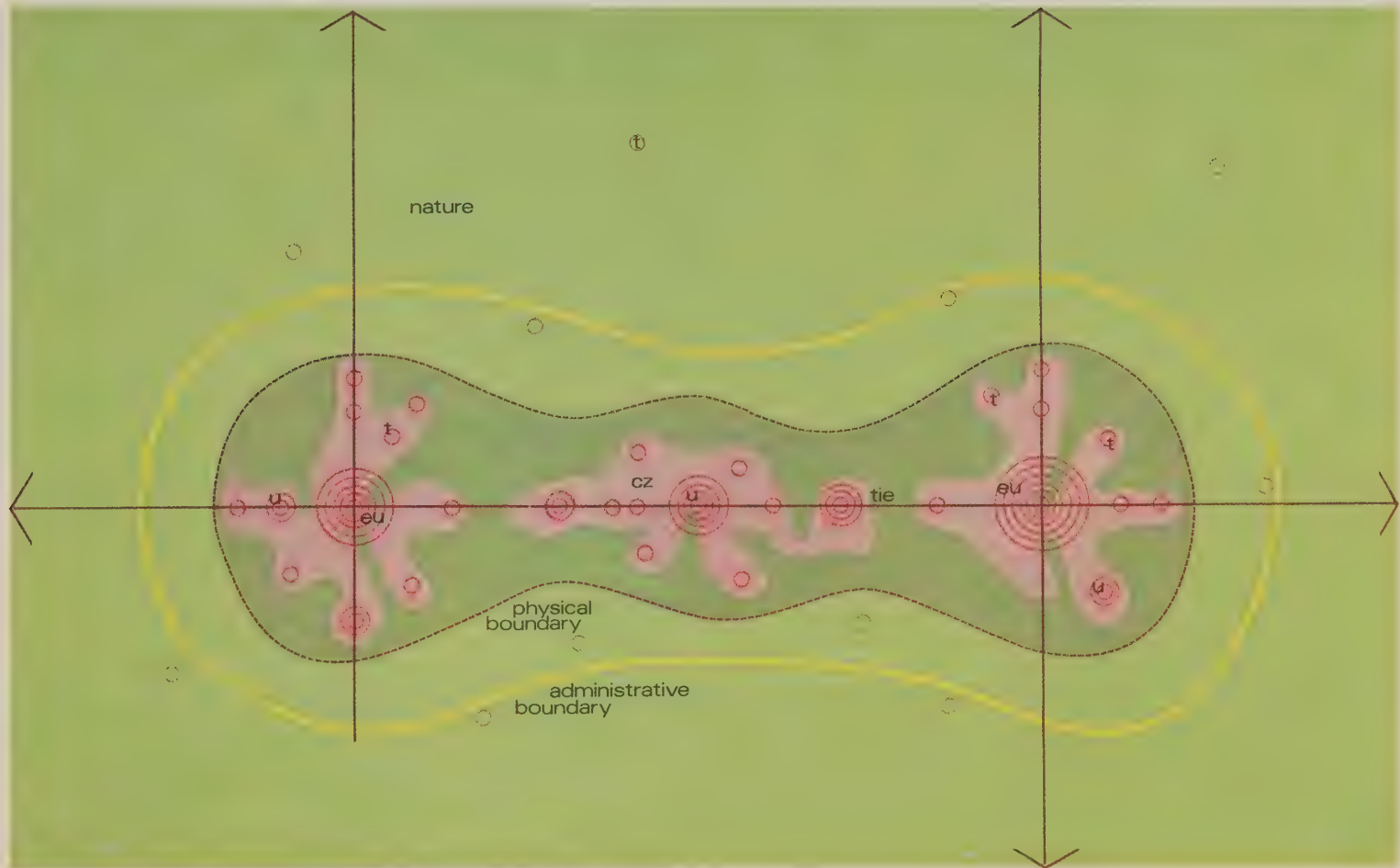
4.2.2 The Urban Detroit Area Study

From Papaioannou's paper, the GLM can be viewed as a polynucleated system of several conurbations joined to each other by highly sophisticated transportation and communication networks. The next two papers deal with the conurbations within the GLM. James Maltby presents some of the key findings of the Urban Detroit Area Research Project. Begun in 1965 as a partnership of the Detroit Edison Company, Wayne State University and Doxiadis Associates International, the five year study consists of a major ekistic analysis of the Urban Detroit Area and its relation to various scales, including the GLM; a comprehensive exploration of desirable and feasible development alternatives well into the next century; and the selection and elaboration of the most optimal alternatives into a conceptual plan.

The Megalopolitan Context

After detailed analysis, the Urban Detroit Area was determined to have a sphere of influence with a radius of 100 miles. This area includes 25 counties in Michigan, 9 in Ohio, and 3 in Canada and encompassed an area of 23,000 square miles with a population of some 8 million in 1970. The growth

Figure 15 Option: Nature within Megalopolis



- t tertiary unit
- u secondary unit
- EU Elementary Unit
- CZ Confluence Zone



of the Urban Detroit Area has been affected by developments experienced by the Great Lakes Area and Great Lakes Megalopolis in particular, which in turn have been affected by developments in the whole of North America. Such an interdependence among various systems will be even stronger in the future.

The Urban Detroit Area, situated at the heart of the newly emerging Great Lakes Megalopolis, has the rather unique advantage of being located, in a larger regional context, at the junction of the American and Canadian portions of the Great Lakes Megalopolis. The significance of this central location was given great weight in the selection of the final alternative for the future growth of the Urban Detroit Area.

The Concept Plan

After a detailed process of generating and evaluating development alternatives, Alternative 120 was selected as the best and is based on the proposal of a new twin urban centre to be created in St. Clair County, near Port Huron, at a distance of some 50 miles northeast of the existing centre of Detroit. This is a major nodal point from the transportation point of view since it is located at the intersection of the St. Clair River and a proposed northern east-west international high speed corridor connecting the United States and Canada. In Alternative 120, Detroit is not independent of the new major urban centre since they form a “twin” complex which together may be considered the new Detroit. This twin complex is potentially expected to reach a total population of about 8.3 million for its urbanized area by the year 2000, roughly double its population in 1960.

The development of the concept plan for the future growth of the Urban Detroit Area recognized two major elements. The first was related to the natural and geographic setting of the study area, and the second to the overall existing and potential development of the wider region of which the study area is a part. The future physical structure is, in fact, determined by a number of major requirements derived from these two elements.

In the context of the natural environment, the most decisive element is obviously the overall configuration of the area as defined by the existence of the large water bodies, which make it possible for only certain sections of the United States portion of the Urban Detroit Area to have immediate land connections with Canada.

A major element of attraction for urban development is water and, therefore, the concept plan for the future Urban Detroit Area provided for the maximum utilization of waterfront sections. Alternative 120 is based on the recognition of the importance of those sections of the Urban Detroit Area

which present the double advantage of being along the water and, at the same time, of having easy land communications with Canada.

In regard to the second major element, it is imperative that the basic structure of the Urban Detroit Area concept plan promotes and emphasizes the central location of the Urban Detroit Area within the wider megalopolitan region. This will be achieved mainly by insuring the best possible functional connections of the Urban Detroit Area with the wider region and particularly with the existing and emerging megalopolitan formations in the Great Lakes Area (Figure 16).

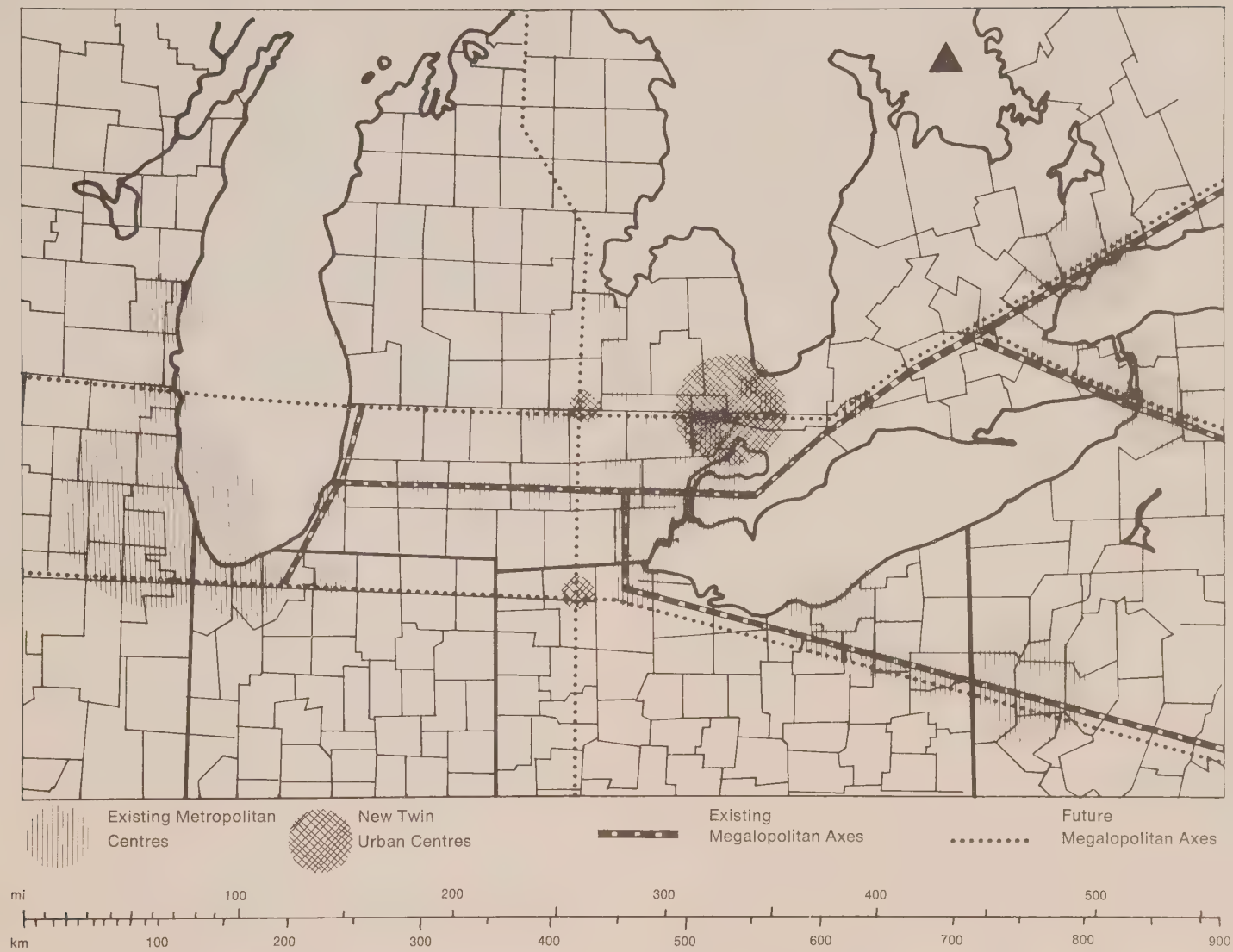
Megalopolitan Corridors

The study of the existing physical structure of the wider region clearly shows that, at present, there is only one megalopolitan corridor from the west: Chicago-Kalamazoo-Jackson-Ann Arbor-Detroit. This corridor splits at Detroit, with one section going northeast toward Canada and the other taking a north-south direction toward Toledo-Cleveland-Pittsburgh.

In order for Detroit to maximize the advantage of its central position, it is both necessary and possible to change the present system. This necessity was understood with the realization that the potential for megalopolitan development to the west of Detroit covers a much wider zone than that of the present megalopolitan corridor. Indeed, as the studies of the Great Lakes Megalopolis have emphasized, the zone of the potential development includes the whole of the Michigan peninsula south of the parallel at Saginaw Bay. A transformation of the present system could make this wide zone a functional part of the megalopolitan development, and could thereby emphasize the Urban Detroit area's central location in the emerging Great Lakes Megalopolis.

With the concept of a new urban concentration in St. Clair County, the new east-west high-speed land transportation axis to the north of Detroit and the reinforcement of the southern east-west axis at Toledo, a new system can be created. Thus, instead of one megalopolitan axis and a few “local” ones in southern Michigan, the new system would cover a much wider zone with three basic transportation lines running east-west, at the two edges and in the middle of the zone. The northernmost axis would become megalopolitan in nature, and probably more important than the middle axis. Together with the new major urban concentration in St. Clair County proposed by Alternative 120, this northernmost axis, through the high speed international transportation facility, would unify and regionalize a significant number of important urban settlements in Michigan: Flint, the Saginaw-Bay City Complex; Lansing; Grand Rapids and Muskegon.

Figure 16 The New Physical Structure for Southern Michigan and UDA Deriving from the Emerging GLM



Source: Doxiadis Associates International

These considerations provide the basic framework within which the broad lines of the Urban Detroit Area were conceived. The fundamental implications of such a framework can be expressed as follows:

- 1 In the east-west direction, three primary transportation lines form the structure of the physical plan.
- 2 These three axes, particularly the two northern ones, due to the number and importance of urban concentrations they will serve, are conceived as carriers of important functions located at various points along their lengths. The creation of new centres of services, commerce and industry is proposed on these axes as twin poles of attraction for the existing metropolitan centres located close to their alignment.
- 3 The northernmost east-west axis becomes particularly important as it forms the basic structures of the new twin urban centres in St. Clair County.
- 4 In the north-south direction, another important axis is the one running along the lakeshore connecting the new twin urban centre with Detroit and Toledo.
- 5 Another north-south axis is proposed west of Detroit, national in character, conceived as connecting the Urban Detroit Area with Michigan and Canada on the North and with Florida and the Gulf states on the South.

Conclusion

In conclusion, the Urban Detroit Area Research Project, although primarily concerned with the future of Detroit, has attempted to define its problem and find its potential solutions within the broader context of the Great Lakes Megalopolis. It was hoped that this study would open the way for studies of other daily urban systems throughout the country. Indeed, it has already been the catalyst for a study of the Northern Ohio Urban System.

4.2.3 Northern Ohio Urban System

With the usefulness of the UDA Study already apparent a year before its completion, a group of three Cleveland businessmen formed a Northern Ohio Urban Systems Research Corporation to pursue a similar study to that of the UDA but focussing instead on the Northern Ohio Urban System (NOUS). Doxiadis Associates were asked to undertake the research work which provided the NOUS Corporation with the flexible concept program and plan that they in turn could seek to implement through government,

industry and the public. Although not a major conurbation in the seventies, NOUS will hold a population of approximately 9 million by the year 2000. It is strategically located as a hub of megalopolitan links connecting Detroit to Pittsburgh and Buffalo/Toronto. Herbert Strawbridge reports on the research work on the Northern Ohio Urban System.

Late in 1969, several private corporations began to investigate the possibility of initiating a comprehensive regional study which would provide guidelines for the optimum future development of the Northern Ohio Region. They recognized that while current planning was highly professional and competent, most of it was restricted to the city and city boundaries, and was often specialized in scope. What appeared to be lacking was a catalyst that would integrate the different efforts, a regional study which would provide multiple benefits for area residents. In July, 1970, a non-profit research organization, the Northern Ohio Urban Research Corporation was set up by the Higbee Company, the Ohio Bell Telephone Company and the East Ohio Gas Company. The function of the corporation was defined as follows: "to assist and cooperate with the various strata of government, to act as a prime mover to make events occur within the region, and to be a repository of information to assist in decision-making."

The chief aim of the NOUS project was not to find immediate solutions to the many complex problems of the area, but to provide its leaders with an overall concept of their region and to propose alternatives for a systematic approach to future development. From the beginning, it was emphasized that the project was intended to supplement and tie together rather than duplicate existing study programs, and that it was designed to provide other planning agencies with new and useful data on a broad basis by adding greater perspective to localized studies.

From the outset, we kept the official government unit planners and political powers informed of what we were doing. Today, such an openness from the beginning has proven most significant. Most significant because those individuals are convinced we are helping them to do their job and they are grateful. We do not have any resistance (except normal governmental slowness to act) among the 1,800 political units with which we must deal. In fact, it is the reverse. Those governmental units want more and more from us.

Following its establishment, NOUSRC appointed DA Inc. as consultant "to define its study area, to inventory that area for existing studies and information, to catalogue problems within the area, and to develop and evaluate alternative plans to alleviate these problems." The boundaries of the NOUS study area were determined by examining the zone of influence of Cleveland, its major urban centre, projecting its future growth pattern and delineating the spheres of influence of neighbouring urban systems.

As in most areas which include a large metropolitan centre, their zone of direct influence does not coincide with political boundaries. Cleveland's sphere of influence or daily urban system, and the extent of the entire NOUS area were thus determined by topographic and demographic characteristics, socio-economic phenomena, physical structure (land use), transportation, and flow of communications (including telephone messages and newspaper circulation).

Past and present conditions were analyzed at four different scales: in diminishing order of magnitude, from the Great Lakes Megalopolis Region (GLMR), to NOUS, to the central NOUS area, to the Cleveland central business district (CBD). A system of four major corridors radiating from Cleveland came to light as the basic urban structure of NOUS. These corridors, formed by the nodal points of Akron, Erie, Youngstown-Warren and Toledo, and the road network which links each to Cleveland, provide connections within NOUS and also link NOUS to the Great Lakes Megalopolis and other regions.

The most critical problems affecting not only NOUS as a whole but also its component parts, were found to be pollution of natural resources (air, water and land) and uncoordinated development of networks and land use patterns. The overall picture of urban development in NOUS is one of unbalanced, unplanned growth.

From the analysis of past and existing conditions, it became obvious that the NOUS area was in urgent need of an overall development plan and a program to coordinate this with the growth of the surrounding region. The major goal of this plan was to achieve a balanced development of the whole urban system, in harmony with the natural environment, and flexible enough to be adapted easily to unforeseeable changes in life patterns, building, transportation and communication technology, location of industry, etc. Suitable recreational land and water areas were to be preserved as well as prime farmland and scenic attractions. The full potential of existing urban centres was to be realized, revitalized and re-coordinated. The smaller urban centres were to be encouraged to relieve existing centres of the pressures resulting from disorganized sprawl, and to provide new job opportunities within easy distance of the declining outlying areas. Economic growth was to be encouraged, especially in the central cities, to aid in overall revitalization.

The goals and objectives identified were so numerous that a large number of alternatives had to be examined to determine the desirability and feasibility of each in relation to the needs and resources of the NOUS area.

The selected alternative for the future development of NOUS is based on a 9.0 million population target for the year 2000.

The major characteristic of the sketch concept plan is that it channels a large portion of the expected development into the central and most urbanized section of NOUS, as follows:

- 1 It is proposed that the main direction of future expansion be along the Cleveland-Akron corridor with particular emphasis at the intersection of this corridor and the proposed new transportation axis, which runs in an east-west direction passing south of Cleveland.
- 2 A second major line of growth will follow this east-west national axis.
- 3 The existing urbanization corridor along the lakefront to the east and west of Cleveland will form a third corridor of future expansion.

The major land transportation system consists of interconnected facilities for both conventional and new means of travel, based mainly on the existing system with the addition of an extensive mass transportation network. This transportation system will not only serve the major urban centres within NOUS, but also connect NOUS with the wider Great Lakes Megalopolitan region and beyond.

The final report of the NOUS Research Project does not propose any one solution or master plan. The essence of the NOUS study is that within logical bounds, it is extremely flexible — it offers a series of alternative plans for future development within the region. If the “mix” should change, NOUS has the capacity to recast these alternatives.

The work of NOUS did not end with the completion of the Doxiadis Study. We have compiled a complete data bank on NOUS for use by governments, the public and industry alike.

The first solid accomplishment of NOUS was to analyze the final reports, and provide the Governor of Ohio with 10 actionable programs, which if achieved would produce the most basic concepts outlined by our study. We are delighted that there has been some activity on several of these programs.

We are continually making representation for action to government at all levels and in surrounding states. NOUS is lobbying for interstate committees to deal with megalopolitan level transportation issues and has appeared before Congressional hearings for the establishment of Ohio's first national park project.

Our project, therefore, is a continuing effort. On the basis of a comprehensive ekistic analysis, we have developed a flexible concept plan that is still far from being realized. But the corporation continues to work towards planned implementation, looking forward to the day when NOUS becomes a balanced, and integral component of a GLM that improves opportunities for safety and happiness for all.

4.2.4 Great Lakes Megalopolis-Canada

In their research on the total GLM in the sixties, Doxiadis and Papaioannou predicted that a “Canadian Extension” of this megalopolitan system stretching from Detroit to Toronto and onwards to Montreal/Ottawa and Quebec City, although non-existent at the time, would emerge into a young megalopolis status sometime in the early seventies. Intrigued by this suggestion, Leman Group Inc. undertook in 1972, a long term program of internal research on megalopolis in Canada. By the end of 1973, two preliminary studies had been completed on GLM-C that confirmed in a tentative way at least, the existence of a megalopolitan formation from Detroit to Toronto/Buffalo and an incipient extension to Montreal/Ottawa, along the lines of Papaioannou’s generic model of Megalopolis.

Although of a preliminary nature, this research compared the Great Lakes Megalopolis-Canada to “accepted” megalopolises in Japan, Europe and other parts of the Great Lakes and the eastern seaboard using clearly megalopolitan indices, population density, population change and interconurbation connectivity.

In the following paper, Alexander B. Leman summarizes the research conducted thus far.

This is a summary of a study undertaken by a team of researchers in Leman Group Inc., aimed at testing a hypothesis that in the northerly section of the Great Lakes Area, specifically in the Ontario-Quebec portion of Lake Erie, Lake Ontario and the St. Lawrence River waterway, there exists a new urban system of megalopolitan scale.

The reconnaissance study identified and presented a preliminary hypothesis of the Great Lakes Megalopolis-Canada, in order to:

- 1 facilitate the formulation of a more developed basic hypothesis through more extensive studies; and
- 2 permit the tentative identification of the next study scale within the research program, i.e. the Toronto-Conurbation, the term for what is otherwise known in Ontario as the Toronto Centred Region.

Building upon the foundations laid by Jean Gottmann, in his epic study of the Northeastern Seaboard of the United States,¹ and upon further extensive research at the Athens Center of Ekistics (ACE)² within the “City of the Future” (COF) Study, we addressed ourselves to the Canadian portion of the GLM.

Although much exhaustive research has been conducted on the Great Lakes Megalopolis by the Athens Center of Ekistics and by Doxiadis Associates

International Co. Ltd., in their Urban Detroit Area Study, data for the Canadian portion was not available to that degree that accurate analyses could be undertaken. In fact, because of this limitation, the urban system stretching from Windsor to Montreal was generally treated as a “future extension” of GLM.

In our study, the same factors as in the U.S. (measured on the same scales) were analyzed in Canada, using 1971 data, and then were compared to the 1961 analysis of the U.S. portion of GLM to provide a general indication of the changes which may or may not show the existence of a Canadian megalopolis.

A preliminary research study such as this one, does not provide an opportunity or resources for extensive, textural analyses of a vast number of variables. We therefore decided early in our work, that a comparison should be made between a model and the image which emerges on the basis of the data available. We turned to “the abstract” developed by John Papaioannou within the COF (City of the Future) Study because there he undertook a major study of urban agglomerations throughout the world and was able to develop certain structural and textural definitions which are applicable to most megalopolises now in existence.

Definition of the “Abstract”

On the basis of this research, Papaioannou states that:

A megalopolis can be visualized as a multi-nucleated band . . . each nucleus of which, being of at least metropolitan scale, must frequently consist of a ‘cluster’ or ‘constellation’ of settlements of varying nature . . . The nuclei are arranged along a main axis, and any two nuclei (particularly two adjacent ones) are interconnected by a system of interactions and flows, at a level clearly exceeding the metropolitan one . . . A megalopolis includes, beyond its nuclei, an area around its main axis that can be considered the first zone of influence . . . and each two nuclei . . . forming a ‘link’ must satisfy a ‘connectivity requirement’ of sufficiently strong interactions and flows within the link. A ‘true megalopolis’ must have a population of over 10 million inhabitants and a density of over 2.0 persons/ha. (ca. 500 persons/sq. mile). A formation satisfying all other requirements, but having a population of only 3 to 10 million inhabitants is called a ‘pre-megalopolis’.

Papaioannou further suggests that each “Primary Unit” (PU) consists of a “centre” (CE) that corresponds to a metropolis. Surrounding this PU is a “cluster” (CL) of “Secondary Units” (U) whose population ranges from 100,000-1,000,000 inhabitants, and perhaps some “Tertiary Units” (TU) with

a population between 10,000 and 100,000. Settlements of a smaller size are thought to be part of a “Dispersal Area” (DA) or “Undifferentiated Continuum” (UN) that has no clear centre within it. Clusters are connected by “Ties” (TI) to determine megalopolitan structure. The megalopolis has a “boundary” (B) and various “zones of influence” (I^n). The connection of two CL’s by a TI within a B determines a “Link” (L). The number of links grows with the “maturity” of a megalopolis.

Accepting this theoretical research and developing Papaioannou’s model slightly to include “primary networks” (N^1) and “secondary networks” (N^2), a model for macro settlement formation can be formed (Figure 17).

In 1971, Brian J.L. Berry (also within COF) developed a theory of megalopolitan confluence zones. Through numerous urban variable analyses, Berry has shown that the area in the middle of an axis between two clusters is experiencing more rapid growth than the clusters, and that the potential for growth in these megalopolitan confluence zones only tends to increase.

One of the cornerstones of our studies was the observation by C.A. Doxiadis³ that growth of human settlements is guided by man’s deeply rooted need to:

- 1 maximize potential contacts, of all kinds;
- 2 minimize effort, in terms of energy, time and cost;
- 3 optimize protective space, whether alone or in a group;
- 4 create and maintain an optimal balance between himself and the five ekistic elements (Nature, Anthropolos-Man, Society, Shells and Networks); and
- 5 optimize in the synthesis of all previous principles.

These, Doxiadis calls the “five basic ekistic principles” of urbanization, and they are important to keep in mind as the emergence of the Great Lakes Megalopolis — same as all other metropolises, cities, towns, and villages — is a direct consequence of human motivation contained within them.

Study Design

In designing our investigation, we felt that a preliminary hypothesis on GLM-C could be formulated if factors that reflected the first two principles, were isolated and analyzed and then related to the land form and land use within the “study area”. The variables that were chosen were those that indicated a heavy concentration of settlements, reflecting principle 1, and those that indicated a maximum of interactive facilities that would satisfy principle 2.

Study Limitations

Four factors limit our study in meeting the full potential for megalopolitan research:

First: the study components were quite large and served only to give a rough indication of the existence and the structure of the Canadian megalopolis. The study is obviously not conclusive — much more detailed work remains to be done using smaller analytical components such as townships and incorporated municipalities.

Second: the absence of thorough, topical data on the United States. For the Urban Detroit Area, our work was based entirely on the UDA Study conducted by Doxiadis Associates International in the sixties. It is hoped that U.S. data will be acquired and analyzed in the formulation of the forthcoming work on the basic hypothesis of the Canadian megalopolis.

Third: the staticity inherent in the analyses. Only the year 1971 was analyzed, although for some variables, 1972 or even 1973 data were used.

Fourth: the comparatively small number of urban factors that were analyzed.

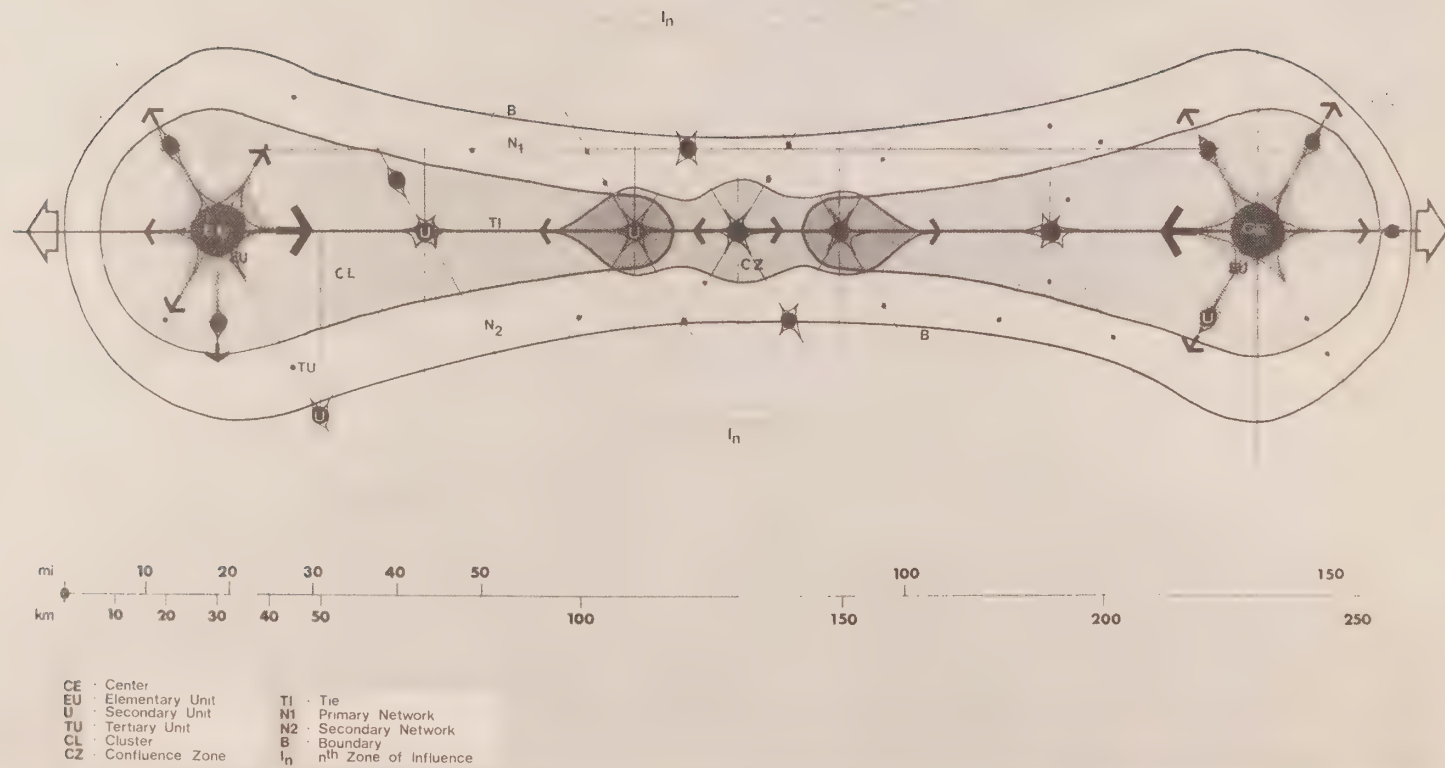
The Variables

The following variables were plotted on large-scale maps of an area stretching from Joliette, Quebec to Toronto/Buffalo and Detroit:

- total population by county (1971)
- total population of settlements over 10,000 inh (1971)
- population density per county (1971)
- percentage of population change by county (1961-1971)
- percentage of urban population per county (1971)
- general hospitals of 100+ bed capacity (1971)
- university enrolment (1972-1973)
- number of provincial government civil servants per county (1971)
- wholesale centres (1970)
- road network (1973)
- air transportation (1971)

Four different types of analyses were carried out in search of a general indication of megalopolis:

- 1 Using “overlay” technique, all factors were analyzed on transparent maps, thus tentatively sorting out boundaries, ties and component clusters;
- 2 All factors measured on a county basis were then scored, in relation to the study area average;



Source: Leman Group Inc.

Figure 17 Megalopolis: A Model of Ekistic Unit 12

- 3 Having isolated some textural and structural characteristics, Papaioannou's "megapolitan connectivity formula" was applied to determine megapolitan-level connections between clusters; and
- 4 Finally, a simplified principal component analysis was carried out using indices developed in in-depth studies of the Tokaido Megalopolis in Japan, the Eastern Megalopolis and of the Great Lakes Megalopolis.

Principle 1. Maximization of potential contacts

Eight factors were analyzed to indicate a settlement formation that satisfied the ekistic principle of maximization of potential contacts between Man and Nature, Society, Shells and Networks. These factors were plotted both by county and by settlement to show population concentrations and trends, as well as to show the service facilities within which some kinds of contacts can occur. In almost all cases, the factors were plotted on the same scales used in the UDA Project, to enable quick comparisons with the Great Lakes Megalopolis.

Studies in both Japan and in the U.S. show that megapolis consists of a continuous band, within which urban population is generally more than 50 percent, but no less than 35 percent, with clusters having at least 80 percent urban population. Our findings indicate that such a pattern has emerged in the area stretching from Detroit to Hastings County but does not continue eastward. The mononucleism of Montreal becomes evident.

Total population by county, as well as the population of settlements with over 10,000 inhabitants were plotted and clearly showed heavy concentration of large settlements on the western shores of Lake Ontario. A clustering is evident in the Kitchener/Waterloo-Guelph area in Waterloo and Wellington Counties. Montreal looms as a mononucleic metropolis to the east some 125 miles from the smaller centre of Ottawa.

A unique characteristic of megapolis is the existence of at least two clusters of more than 2,000 inh/sq. mile joined by a band of density not less than 100 inh/sq. mile. This description corresponds to the links between Toronto and Buffalo, and Toronto to Detroit. This continuous band of uniquely megapolitan densities does not stretch from Toronto to Montreal.

The highest densities are along the western shore of Lake Ontario. Medium densities are evident in Essex County adjacent to Detroit, in Middlesex County (London), in Waterloo County (Kitchener-Waterloo) and in Ottawa-Carleton. There are similar patterns in the Tokaido Megalopolis which, in 1965, had an average density 9 times greater than this study area did in 1971, and in the Eastern Megalopolis which in 1965 had an average density only 1.7 times greater than this area did in 1971.

Another characteristic of megapolis is the existence of a continuous band within which at least a 10 percent increase in population has occurred in the preceding 10-year period. Although the metropolitan clusters themselves may experience only an increase from 0 to 20 percent, the adjacent areas usually experience population growth from 20 to 100 percent. This pattern applies to Toronto-Buffalo-Detroit links.

The percentage of urban population in 1971 was measured by county, taking into account only those settlements with a population of over 10,000 inhabitants. To consider the percentage of urban population in isolation is misleading.

Social Factor

General hospitals were plotted as they provide an indication of human concentration which occurs for the maximization of potential contacts, i.e., access to vital services, when needed.

Cultural Factor

Universities indicate a population concentration of a degree that can support such institutions, and they serve as important cultural contacts as well. Indeed, Gottmann holds that a special attribute of megapolis is the comparatively high concentration of institutions of higher learning on which the politics and economics of such large, complex and dynamic urban agglomerations depend.

Analysis of regulatory (politically-administrative) and economic factors were also carried out with similar exemplar/illustrative (rather than definitive!) data, reinforcing previous findings.

Principle 2. Minimization of Effort

In order to help determine the structure and texture of the urban system, an outline of networks that allows the minimization of effort, time and cost in making the contacts at a macro scale, was identified and defined.

Findings

From these analyses, it is quite evident that parts of the area under study have reached a megapolitan state of development, stretching from east of Cobourg to, and including, the Urban Detroit Area, where a link is made with the remainder of the GLM.

Each of the counties analyzed using megapolitan indices, has shown patterns that have been recognized in the megapolises in Japan, the Eastern Seaboard of the U.S., and along the U.S. shore of the Great Lakes.

Although each of the analytic methods used, supports a preliminary identification of GLM-Canada, an effort was made to synthesize them so that a more precise definition of the extent, boundaries, major clusters and ties could be made on which to base a preliminary hypothesis. The following four methods were undertaken sequentially:

“Rounding-Out” Method

This first effort at synthesis was basic and included all analyses undertaken both by county and by separate settlements. Although largely subjective, the results of all other analyses corresponded almost exactly to the first “sketch”.

Study Area Average

This method was used by Catherine Nagashima in her work on the Tokaido Megalopolis. Essentially, the analysis illuminates texture and structure within the study area only. Findings in our study area reinforce the findings of the “rounding-out” method.

Mathematical Definition of Megalopolis

Having ascertained major clusters, we examined our findings in the light of the connectivity properties of megalopolitan links. J.G. Papaioannou’s formula was used on the Toronto-Detroit link, the Toronto-Montreal link, and on the Toronto-Buffalo intro-cluster formation. Among the 13 megalopolises recognized in 1960, the Toronto-Detroit and Toronto-Montreal links were described as pre-megalopolitan. Papaioannou found that “A megalopolitan grouping is called a true Megalopolis, if the strength “S” in any one of its links is equal to or larger than 4.00”.⁴ The formula was repeated in this study on the same links, using up-dated information 10 years later. This was the most objective “check” of our findings, using a universal norm. The findings were tabulated in Table 2.

Table 2 **Megalopolitan Strength**

Link	N	T	$P = \sqrt[2]{P_1P_2}$	S (Strength)	D (km)
Detroit-Toronto	1.5	1	3.07	4.2	377.6
Toronto-Buffalo	0.5	1	1.72	4.2	156.8
Toronto-Montreal/Ottawa	0.0	1	2.39	3.1	544.0

Judging by this formula, the Toronto-Detroit Link is clearly megalopolitan, as is the Toronto-Buffalo link as well. The Toronto-Montreal link is now weak and non-megalopolitan. It is, however, expected to strengthen quickly.

In 1961, Papaioannou found the Toronto-Detroit Link to be only 3.57 and the Toronto-Montreal Link was only 1.07. Somewhere in the past decade, the level was clearly reached for Toronto-Detroit, and increased rapidly for Toronto-Montreal. Looking at Papaioannou’s world-wide results, the Toronto-Detroit Link today is equal to the 1961 megalopolises of Randstadt-Stuttgart, Ruhr-Berlin, Paris-Randstadt, Chicago-Milwaukee and Detroit-Pittsburgh.

Principal Component Analysis (simplified form)

Having isolated clusters and determined megalopolitan connectivity strengths between them, a final method was used as a synthesis. This method involved the isolation of uniquely megalopolitan indices for the factors of total population, population density, percentage of population change in a 10-year period, and percentage of urban population. The scales off which one of the factors has been measured and keyed on the various maps in this study, were broken down from six or seven steps into “high”, “medium” or “low” levels per megalopolitan index.

Table 3 **Megalopolitan Indices**

Score	Total population	Density inh./sq. mi.	% Urban population	% Population change 61-71
Low 1	100,000-600,000	100-500	20-49.9	0-19.9
Medium 2	600,000-2,000,000	500-1000	50-64.9	20-49.9
High 3	2,000,000 +	1,000 +	65-100	50-100

Each county was then scored for each factor, using the above values. Totals ranging from 0-11 were ascertained. This 11-point scale was simplified to four levels that correspond to four principal megalopolitan structural components:

- Primary unit 9, 10, 11
- Cluster 7, 8
- Corridor 4, 5, 6
- Dispersal area 1, 2, 3

The results were then plotted by county.

Preliminary Hypothesis

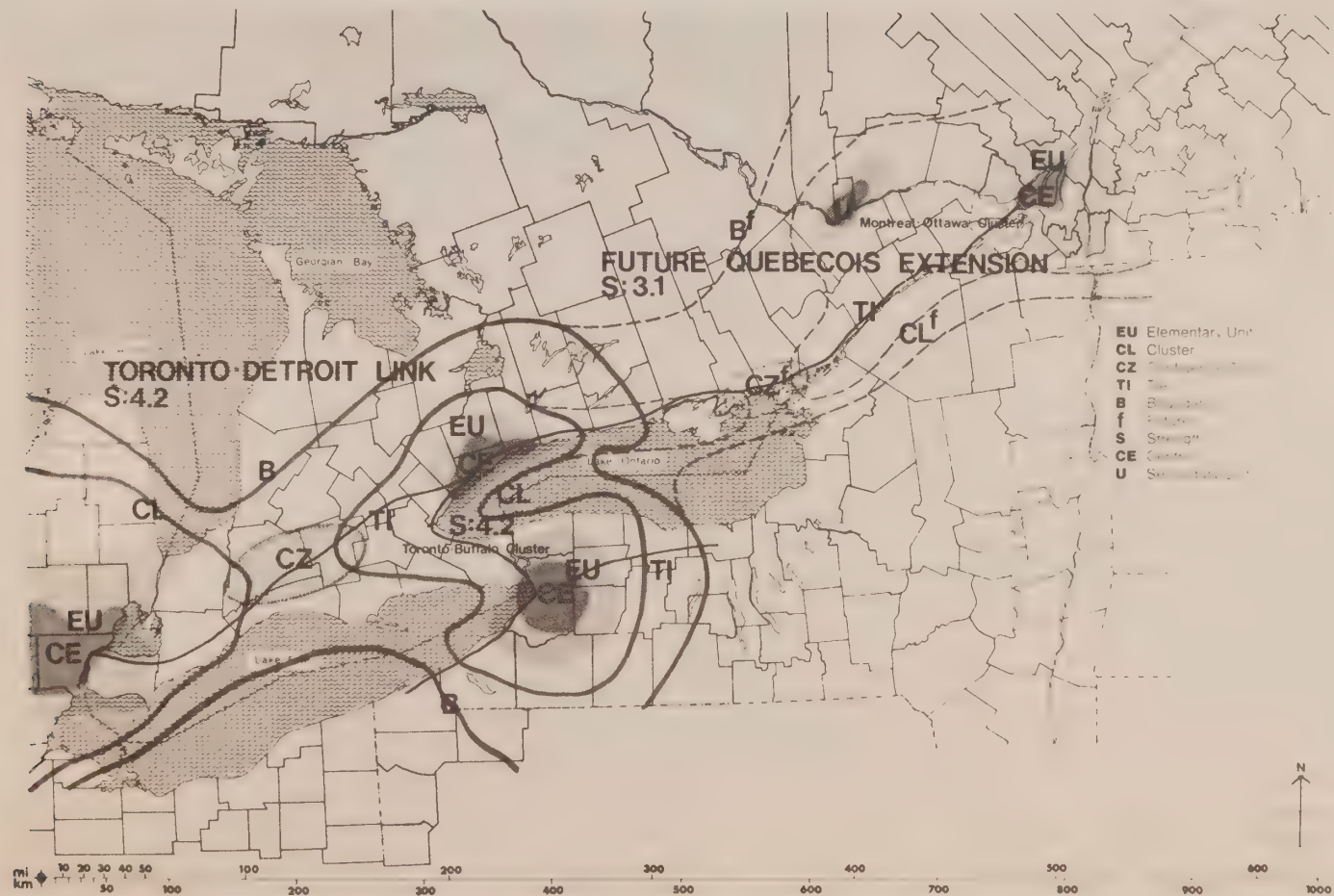
In comparison with the megalopolis model (Figure 17), a preliminary hypothesis on the components, ties, dispersal area and boundary of the Canada megalopolis can now be forwarded (Figure 18). Two megalopolitan clusters can be seen in the Detroit Area and in the Toronto-Buffalo Conurbation. The two clusters (CL's) are joined by the MacDonald Cartier

Freeway which is the megalopolitan tie. A confluence zone is evident in the London Area.

Megalopolitan formation does not continue to Montreal. An extension to Montreal, Ottawa, and Quebec City may develop in the next 25 years, but only after the Toronto-Detroit Link has met its full megalopolitan potential. Indeed, in the Toronto-Montreal link, Kingston can be seen as a future megalopolitan confluence zone.

Figure 18 Preliminary Hypothesis: Great Lakes Megalopolis — Canada 1973

Source: Leman Group Inc.



Following the above work, further studies are in progress particularly in the Toronto-Detroit and Toronto-Buffalo links of the GLM chain (Figure 19). Much finer data are used; instead of communities, the townships and

incorporated municipalities provide a better and more accurate image. At this scale, the delineation and definition of the Toronto conurbation are of particular current interest to us.

Figure 19 Preliminary Hypothesis: Toronto/Buffalo-Detroit Link 1973



Source: Leman Group Inc.

4.2.5 The Windsor-Quebec City Urban Axis

Professor **Yeates**' skepticism of the reality and validity of the GLM concept has surfaced earlier in his comments to Professor **Gottmann**'s keynote address. His research, it must be remembered, is not directed towards relating to any model of this urban system as part of the GLM, but instead focusses on an extensive presentation of data on the urban axis development itself. Professor **Yeates** places that axis not in an international context, but in a national one instead, by interpreting its importance to the urban processes within Canada.

Professor **Yeates** in his research provides a valuable Canadian data base for further work on the pattern of settlement in this area of Canada which is in fact an urban system, an "urban axis" that as a whole is greater than the sum of its constituent parts.

Rather than try to summarize the entire Windsor-Quebec City axis study, my presentation will focus on:

- 1 identifying the limits of urban development within the axis in 1961 and 1971;

- 2 outlining the importance of the urban axis to Canada; and
- 3 projecting the spatial extent of urban development in the axis to the year 2001.

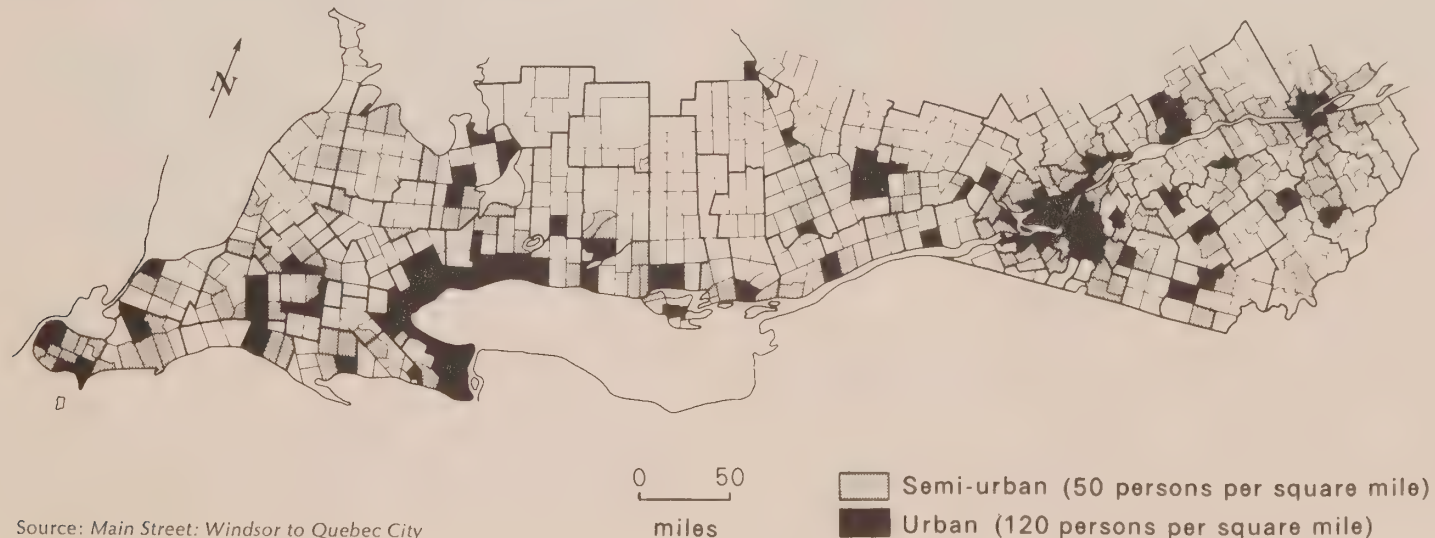
In the last section, I will also comment on the implications of these growth trends for Montreal and Toronto.

The Extent of Urban Development in the Axis Area

The location of the urban areas and their spatial extent depends upon the definition of the word "urban", and the geographical units to which the data pertain. In this study, I assume that the urban areas lie within the spheres of influence relating to the major metropolises and regional centres in southern Ontario and southern Quebec. These spheres of influence combine to form the Windsor-Quebec City axis, the outerlimits of which are indicated in Figure 20.

This large area (67,500 sq. miles) contains a vast area of agricultural and waste land as well as the majority of Canadian cities. The first task is to determine the extent of urban development within this axis.

Figure 20 Windsor-Quebec City Axis: Extent of Urbanization 1961



Source: Main Street: Windsor to Quebec City

The term “urban” can be defined in many ways — socially, economically, and politically. The most common definition is in terms of population density as this measure embraces many components of the urban concept (crowding, intensity of land use, interaction, and so forth). Density, however, relates to areas, and if a map is not to be misleading, the areas have to be as equal in size as possible. Thus all municipal populations have been allocated to the census subdivisions (or townships) in which they are located, and the small census subdivisions in southern Quebec have been aggregated so that the average area of a data unit in southern Quebec is almost the same as the mean area of those in southern Ontario.

Russwurm (1970) has provided a fairly good argument for using particular critical limits to distinguish between urban, semi-urban, and rural census subdivisions. In his empirical survey of population densities in the “corridor” between Stratford and Toronto, he determined that those census subdivisions in which the population density was less than 50 persons per square mile had a population that was usually less than half non-farm, while those with a population density of greater than 50 persons per square mile usually had a population of greater than half non-farm. Thus, a density of 50 persons per square mile can be used to distinguish between rural and semi-urban (including urban) census subdivisions.

The argument supporting the density distinguishing between semi-urban and urban census subdivisions (120 persons per square mile) is more complex. Briefly, it is based on an estimation of the density of non-farm residences that are usually found in an area when preliminary urban services seem first required. This is estimated to be about one residence parcel per 25 acres, to which is added the average rural farm density in southern Ontario of 20 persons per square mile.

These critical limits (50 and 120 persons per square mile) are interesting because (1) they are based on some empirical investigations of densities, and (2) they are similar to the densities used in the ekistics literature to define the limits of megalopolitan areas.

The Location of the Axis in 1961 and 1971

The maps of distribution of population density for 1961 and 1971 (Figures 20 and 21) indicate an increase in both urban and semi-urban areas between the two periods. The semi-urban and urban areas are quite continuous along the whole axis in 1971, though the middle section in eastern Ontario is mostly rural. The area embraced by the census subdivisions defined as urban in 1971 is quite extensive (11,072 square miles) and has an average population density of 894 persons per square mile. To place these figures in

perspective, we should note that the area defined as urban is about the size of Belgium (which has an average population density of about 820 persons per square mile).

The increase in extent of urbanization between 1961 and 1971 has been quite dramatic. The area defined as urban has increased by almost 19 percent, while the population contained within it has increased by more than 28 percent. The total area defined as semi-urban has increased slightly (1971: 14,857 square miles), and the population in this area has increased slightly also (1971: 1,084,073 persons).

There is, therefore, a continuous strip of urban and semi-urban development, increasing in extent, between Windsor and Quebec City. The area can be divided into thirds, in which urbanization is fairly extensive in the western and eastern sections, but somewhat fragmentary in the middle zone.

The Axis as Canada's hinge

Even though the axis is not of major proportions on an international scale, it is extremely important to Canada. The area defined as urban in 1971 contained a far greater proportion of Canada's population (46 percent) than that of any other major linear agglomeration for its respective country. Furthermore, the axis area contains over 70 percent of the manufacturing employment in the country, and the average income in the area is over 10 percent greater than that in the rest of the nation.

Thus the axis is extremely important in a Canadian context. Indications are that this level of importance increased quite dramatically between 1961 and 1971, for in 1961, the areas defined as urban contained only 42 percent of the Canadian population (46 percent in 1971). The average annual growth rate for urban areas in the axis during the period was 2.56 percent compared to 1.7 percent for Canada as a whole. This level of importance can also be deducted from analyzing traffic and commodity movements, which suggest that it is the focus of the nation's economy.

The Axis in the Year 2001

In any attempt at forecasting future urban land requirements, transport needs, demands for housing, and so forth, the “futurist” must estimate the most likely population, and its distribution, at some future date. Population forecasting is a hazardous business, and I will outline briefly the methodology used in this study. Basically, it involves a combination of forecasting for

large regions in Canada, then allocating the forecasts for the axis to subregions which are then allocated to the census subdivisions (and aggregations in Quebec) using the method of cascaded averaging, and differencing as described by Curry and Bannister (1974). The advantage of this procedure is that it preserves the relative stability of large region forecasts, while still permitting historic variations in growth between census subdivisions to be expressed.

The product of this hierarchical method of forecasting yields estimates of the population size of Canada for the year 2001, for four major regions in the country (one of which is the axis area), and the probable distribution of urban densities in the axis. Figure 22 indicates the distribution of urban and semi-urban areas in the year 2001, and demonstrates a considerable increase in both the area defined as urban and the number of people residing in the urbanized area between Windsor and Quebec City.

At the turn of the century, 16.6 million people, or 50 percent of the forecast population of the country, will be residing in those census subdivisions

classified as urban in Figure 22. The area occupied by these census subdivisions will increase from 11,072 square miles in 1971 to 16,163 square miles by the year 2001, with a concomitant increase in average density to almost 1,027 persons per square mile.

The Concentration of the Population in the Vicinity of Montreal and Toronto

One aspect of Figure 22 which is quite noticeable is the apparent increase of population in the areas immediately adjacent to Montreal and Toronto. I have attempted to illustrate this increase in population and the changes in concentration that are likely to occur by calculating the populations within a radius of 40 miles of the centre of both Montreal and Toronto in 1971 and 2001. These data are compared in Table 4.

The forecasts suggest that whereas 30 percent of the population of Canada resided within 40 miles of either Toronto or Montreal in 1971, by the year 2001 about 34 percent will be concentrated around these two metropolises.

Figure 21 Windsor-Quebec City Axis: Extent of Urbanization 1971

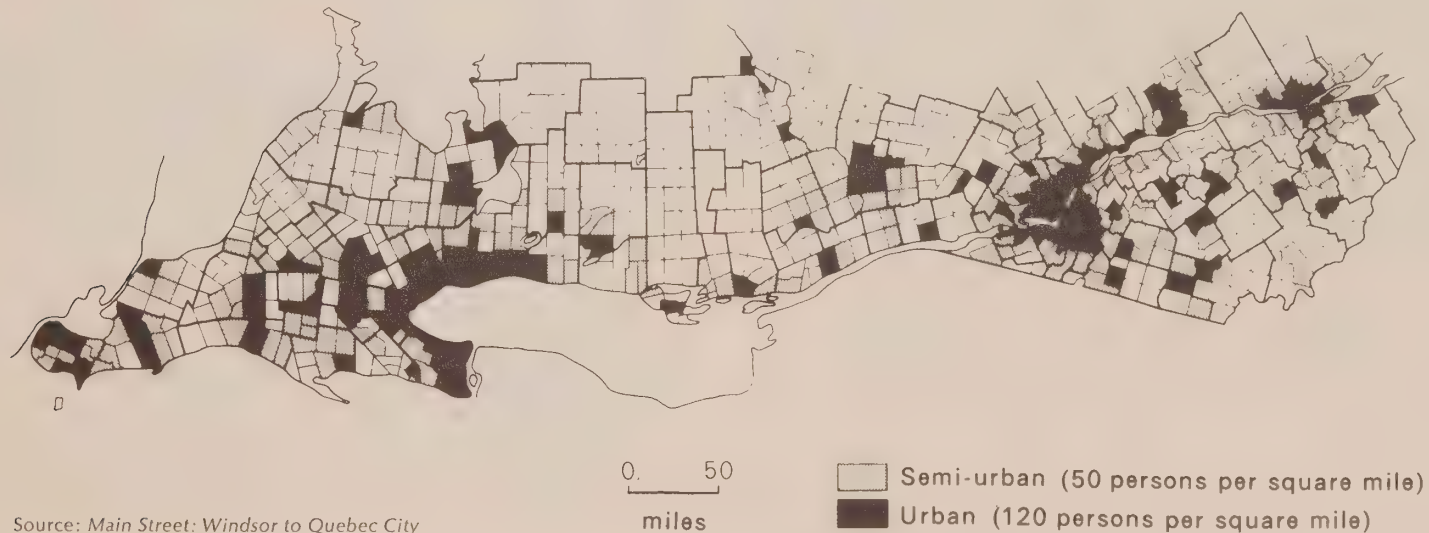
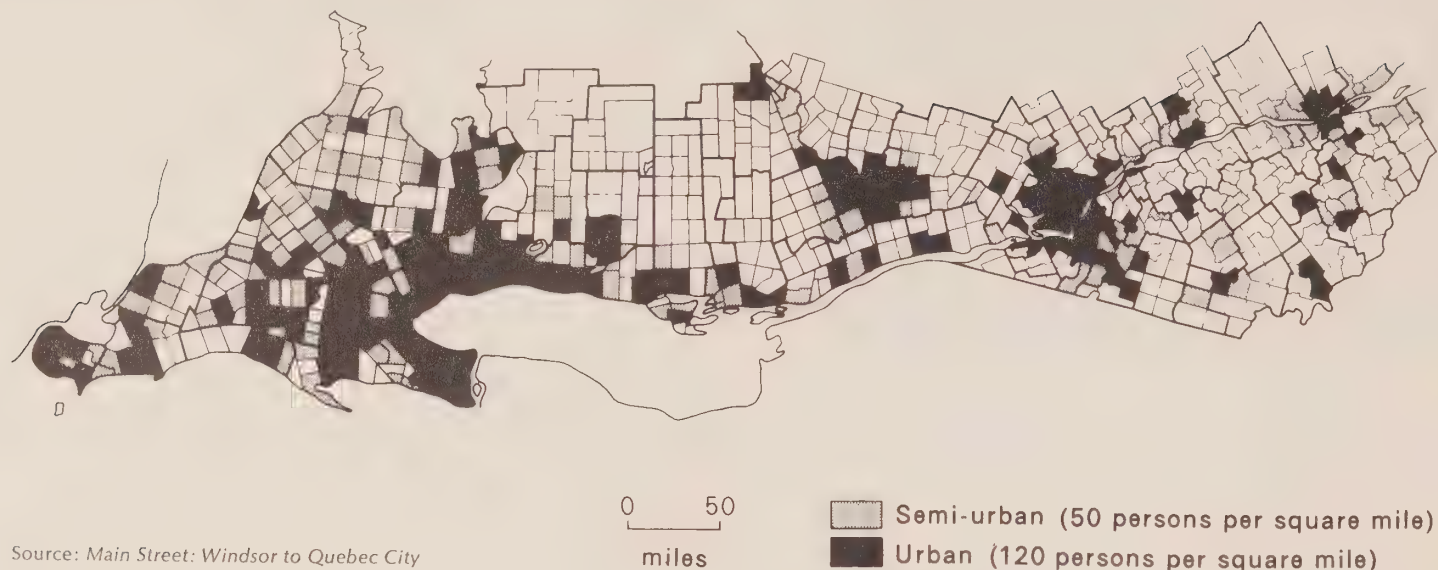


Figure 22 Windsor-Quebec City Axis: Extent of Urbanization 2001 (estimate)



Source: Main Street: Windsor to Quebec City

The trend data, supported by a close examination of some economic indicators, suggest that the increase in population within one hour's commuting time of Toronto is likely to be much greater than that for Montreal. In fact, it is forecast that by the year 2001, one out of every five residents of Canada will be located in the Toronto area.

Table 4 The expected concentration of population (in thousands) around Toronto and Montreal: 1971 and 2001

City	Area (Square miles)	1971 Population		2001 Population	
		(000's)	%	(000's)	%
Montreal (40 miles)	4,343	3,173	14.7	4,558	13.8
Toronto (40 miles)	2,345	3,397	15.8	6,645	20.2

Note: Percentages relate to the total and forecast population of Canada.

Conclusion

There is, therefore, an extensive and almost continuous, urban population located between Windsor and Quebec City, with the greatest concentrations of population being found around Toronto and Montreal. This urbanized area plays a dominant role in the economic, political and social aspects of Canadian life. Forecasts indicate that by the turn of the century, the area will be extensively urban, and there will be a disproportionately large increase in population in the western one-third.

I will conclude by observing that these forecasts are based on national, regional and local (township) trends in population growth. The assumption is that we will continue allowing growth to occur in the same way as it has in the immediate past. Growth is directly related to employment opportunities, and the only way that growth can be affected is by influencing the location of jobs. The map for 2001 presents a scenario of what might happen if we permit the concentration of employment opportunities in the urbanized portion of the axis to continue. The desirability of the continuance of this trend should be "item one" for debate on our national urban agenda.⁵

4.3 GLM Today: A System Without Balance

According to Doxiadis' last investigative up-date, the Great Lakes Megalopolis today is a huge, dynamic and complex organism holding 74.5 million people in 866 counties stretching from Milwaukee to Chicago, Detroit, Pittsburgh, Buffalo and northeast of Detroit as far as Toronto, with an emerging link to Montreal. Within a generation or two, GLM could well be the home of 100 million human beings, all of whom will seek the advantages and opportunities which only megalopolis has to offer.

Will their needs and desires be met? Or will the GLM be a catastrophic disappointment? Will it be a true home for human life? Or will the GLM be a disaster of congestion, inequality, ugliness and despair — in short, a broken promise of myopic forefathers?

There is a thin line between alarmism and rational statements of real problems that must be solved. The concluding part of this chapter is definitely the latter. Doxiadis presents his views of what are indeed our "major problems" — disorganized expansion, manifested in network confusion and waste of land, a future without guidance. His message is clear: If the GLM is to become a truly humane system of human settlement, it must seek what Doxiadis calls "a marriage between nature and city" at a scale heretofore inconceivable — where the partners are no longer the metropolis and the green belt.

Disorganized Expansion

Disorganized expansion of the various human settlements within the Great Lakes Major Region causes many problems such as the conservation of the natural environment, the physical structure of the individual settlements, the efficient operation of large urban systems, and many social problems. Some of these can be solved rather quickly, but others necessitate major and systematic efforts over a long period of time.

Major Network Confusion

The main cause of disorganized growth is the lack of an overall conceptualization and an overall plan for the Great Lakes Major Region which could guide local development towards proper growth. One example is the confusion of the major networks, since there is no coordination whatsoever between the location or administration of roads, railroads, electrical power lines, gas, and oil pipe lines, and telecommunications (Figure 23).

Pollution of water and air which depends on the technology used, can be overcome by changes in this technology; but the pollution of land by many networks can only be overcome by concerted effort over many generations. The reason is that, once a railway or a highway has been built, many changes occur around it, such as the reorganization of land ownerships, and various kinds of development. This means that, even after the initial costs have been amortized, it is difficult to eliminate certain lines because of the many other investments created around it.

This problem seriously affects the GLM-System which not only cannot eliminate its present chaotic networks but, on the contrary, will need more and more networks, because of its importance as a key area of North America.

Conclusion

Disorganized expansion is directly connected and in many ways caused by the confused development of networks (Figure 23).

Two Case Studies

The result of the confused network system is the wastage of land resources, and we have calculated that more than 80 percent of the land could be saved if all networks were confined within certain corridors. The problem of spoilage of the natural environment (cutting down trees, changing the landscape, noise, spoiling aesthetic values, etc.) could be greatly reduced if the networks were coordinated.

To clarify how serious the problem is at each scale, we can look at two areas which have been studied in detail: the Urban Detroit Area and the Northern Ohio Urban System. These studies showed that the despoliation of land is at least five times larger than necessary. In the Urban Detroit Area Study, it was proved that the land needed could be reduced to 15 percent of that used today.

This is not all, because the land directly used by networks is only a very small part of the land which they negatively influence. This can be understood when we think of the large area negatively influenced by the noise of the transportation lines.

Conclusion

Disorganized expansion is even more dangerous than is apparent as it affects not only one, but all scales of development.



Figure 23 Major Network Confusion in the GLM-Canada

The Future without Changes

Looking at the past and present, there are many possible futures for the Great Lakes Major Region, all of which depend on the attitudes of the people and their ability to take decisions.

One future that can be clearly predicted is the continuance of the present trends which have been following the same principles and laws since 1825. This future situation is clear: the continuous disorganized expansion will be even more disastrous than it is today for the following reasons:

- 1 Expansion will take place at a higher speed.
- 2 Society as a whole will not be able to save energy.
- 3 The new developments will be larger than before.
- 4 The land resources usable both for agriculture and cities will become more limited.
- 5 The water resources and shore lines which have been saved in the past and can still be saved will be eliminated.

If the total system remains without guidance, then the urban centres will necessarily follow the same road of disorganized expansion. Even these urban centres which take the initiative to make proper plans for their future will fail when they discover that there is no guarantee of coordination with their neighbours, since there is no authority to control the broader systems. The same failure will affect the higher level authorities, state, provincial, federal governments, etc., if they announce broad plans for transportation, water conservation, etc., if these are in conflict with the plans of individual urban centres.

Disorganized expansion of the urban centres will result in all the weaknesses already presented as well as the following:

- 1 Very low density housing developments will continue and this will mean an increasing waste in land resources, energy and cost for infrastructure and operation.
- 2 Conflicts between neighbouring cities, townships, etc. in land uses will increase as each will continue to place disturbing industries and other functions to suit their own territories. In most cases, this will cause great disturbance for their neighbours.
- 3 As the total transportation and utilities systems will lack coordination, their total length, cost, operation effort will be much larger than necessary.

Conclusion

If present trends continue, the problems and dangers will be increased at all scales.

The basic conclusion from this chapter is a critical one where all policy and programme planning must rest if coordinated action is ever to emerge from the prescriptive vacuum that exists today.

GLM will not go away. It will grow and expand — more people, more networks, more shells, and more problems of system imbalance will confront us unless we assume a meaningful approach to GLM: one that realizes the benefits and great potentialities for human well being which are enhanced in the megalopolis and which are desired by more and more people; one that realizes the continuation of the present scheme of things and that will provide these benefits; and one that therefore realizes that our goal is one of rectifying the current system imbalances so that the GLM can indeed develop in the fullest human sense as it grows and matures.

5 What are the Issues?

What is the impact of these new patterns of urban life? The changes are not only rapid, but as **R. Buckminster Fuller** points out, they are vast in number and are the substantive, “big pattern changes”. The familiar and the reliable reference points and widely accepted criteria are disappearing or are no longer as firm as they once were.

In such circumstances, as in the past, the prophets of doom come to the fore, and for many, the single major outstanding issue is not whether the end is really near, but what form it will take. In the late sixties, it was to be in the form of pollution; then overpopulation; in 1973, it was the food shortage, and in 1974, the energy crisis. That the world is still alive and relatively well, might be somewhat disappointing to some, for whom the “doomsday syndrome” is an escape from the responsibility to act!

Not to downgrade the problems or disregard the concerns — it should be obvious by now that most of the contemporary problems of mankind, originate in or are caused by, “cities”; and it is therefore there, that solutions must be sought.

What other alternative then, is there for an intelligent species like humans — but to act; to relieve the pressures, to reduce the aggravations, and to even remove the causes where possible? That will at least make the period from now to “doomsday” more bearable; and most importantly, the end may not come, after all.

Since we now know that no phenomenon grows in the form of an ever-stretching straight line, but in the form of an “S-curve”, there is considerable scientific opinion that the problems of today are not really the problems of tomorrow; many will be solved, many will be displaced and most will be replaced by the new ones.

*In the discussion during the Symposium, it became clear that the issues arising within any megalopolis and therefore within the GLM as well, must first be placed in the context of time and in the context of the knowledge available for any action. The exchange of views by the participants contained in the first part of the chapter, reflects that awareness. The main body of this chapter, however, hovers around the issues which Professor **Jean Gottmann** raised in his Keynote Address (p. 5).*

*The last portion of the chapter really opens the discussion of the means available to humans to deal with the issues. As Dr. **Margaret Mead** winds up a wide-ranging discussion in Chapter 1 by concluding that — whatever*

*we call it (megalopolis), we must agree on minimum points and get on with the job — so does Professor **Earl Murphy** conclude that “in this electric age, it is too bad that we cannot pull the plug, but we cannot . . .”; so we must face reality and seek the best solutions available.*

5.1 Time

Time, both as a negative and a positive factor, is frequently and widely misunderstood. Perhaps part of the reason for this is that in most languages of western culture, time is a concept perceived as an instant, and not as a continuum; the distance between two instants of time is therefore, neither perceived nor relied upon as a continuum during which certain actions (good and bad; positive and negative) can take place so that a phenomenon or an issue eventually emerges changed.

The discussion which follows is of interest because it shows perceptions of time uniquely different to the perceptions of the western culture described above.

Langan: One thing that worries me is that as we are moving towards achieving some kind of a governable wholeness, maybe time is running out; maybe things are caving in from below. While our consciousness is growing towards planetary awareness, some other people, much less aware, seem to be causing the whole thing to cave in from below. I think it is extremely important that we remember that when we talk about time being one of our resources, we are not only talking about the budgeting of the time of the individual; we are talking about the time that is running out for society, including the problem of the whole society caving in from the outside, as well as from within.

Mead: I would like to answer Professor Langan. If time were not running out, we would not do a solitary thing. Man has been living on this planet for a long time with the prospect that sooner or later, everybody will die or move away and the problems will resolve themselves. The only hope that we have now is that enough people will realize that we have not all the time in the world. So I am glad that we have not all the time because otherwise, we wouldn't even be sitting here.

McLuhan: At the acceleration that now takes place in intercommunal speeds of information, movement and human experience now take the form of

instantaneous interplay around the planet. The dimensions of involvement are total and instant and planetary and when you talk about time running out, it is a new kind of time that we live in. There is no more clock time. That belonged to another hardware age altogether and there are none of the hardware divisions between people that once existed. They don't exist except in the rear-view mirror. Now when the matter of time comes up, keep in mind that instantaneous involvement of everything and everybody, is what we live with.

Papaioannou: We believe that whereas the problems of governance, resources, and environment are going to be extremely difficult in the next 20 to 30 years, when we get beyond that period, when technology will have evolved further and the rates of growth of population and various other related phenomena will have sufficiently slowed down, it will be much easier to coordinate figures for population with figures for resources. Actually, what we found is that if we go sufficiently far into the future, in the order of perhaps one century ahead, then there will probably be no great problems for feeding a population in the order of 20 billion or more, for having enough energy for it, for providing enough water, minerals and many other things. However, there will emerge one major factor which will be difficult to satisfy, and that factor is space.

In our research on ecumenopolis, we found that the most limiting factor of all is space, and space as related to densities that can be achieved on habitable land, will allow a maximum population of about 20 billion people. There are many reasons that, if this is maximum, the real number will come close to this figure. Extensive studies show that with an adequate future perspective, it will be possible to feed more people, to have more energy for more people — although in the near future, the difficulties will be great. So the main factors for adopting a figure in the order of 20 billion are limitation of available space and environmental considerations on the earth.

Concerning political stability, again I would say that this is something extremely difficult to predict. It is probable, that in the near future (perhaps in 20 or 30 years), we are going to face a great discrepancy between rapid growth of population and available resources, and increasing disparities between the poor and the rich nations of the world. These factors, among others, are likely to create tensions and lead to a greater political instability in the near future. In which particular ways they will be expressed, we do not know, but we have seen some of the results recently. It could be hoped, however, that when this difficult period of 20 or 30 years is over, when these tensions have subsided, it will be easier to have a relatively greater political stability. Whether it will be achieved or not, I couldn't say for certain, but the indications for it are there.

Roy Wolfe: I should like to take issue with John Papaioannou's statement, that this study has shown that our problems are serious on a short term, but not on a longer term. I should like to suggest that it is exactly the other way around: that our short term difficulties are annoyances, but not crucial, and that the long term difficulties, could easily be fatal for our civilization, unless we face the problems coming to us now. *

Papaioannou: I do not disagree that the difficulties that we are going to face will increase in gravity in let us say, in the next 20 or 30 years, and that they may even be fatal. But I believe that it is more probable that humanity will be able to mobilize itself and find the forces to fight this prospect, and get through; and so, 50 or 100 years later these problems will be somewhat easier to solve. But I agree that we are going to go through a dramatic crisis which will be much worse let's say 20 years from now than it is today.

5.2 Knowledge

However useful it is to know that there is not much time left before the convergence of a number of issues creates problems more grave than those of today, it is essential to possess knowledge and understanding, if action is to be successful.

"Action should not be a reaction, but a creation", wrote the rioting students, on the walls of Paris in 1968. It can be that, only if it is based on knowledge.

Alexander B. Leman responds to a question:

If you think of a megalopolis as an uncontrolled, vast spread of asphalt and as a massive suburban sprawl, then it is to be deplored. We might deplore the megalopolis in which we live in a quarter of a century from now, if we do not realize what we are doing, what the megalopolis is, and what we can do about it. It is there that ekistic science is useful, because, as I said earlier, it is the science of human settlements; it is an attempt by a number of people around the world to recognize that man has in the past developed different bodies of knowledge in order to understand the world around him (We have come to call these bodies of knowledge, "medicine", "economics", "engineering", "physics", "chemistry", and so on.) . . . but what man has failed to do is to develop that body of knowledge that pertains directly to human settlements, to the places in which he lives; to understand how they became, what they are, and what they ought to be. Man built his places intuitively, at a slow pace, and had time to correct and change misfits he discovered and mistakes he made. Only in the last 150 years or so, these small, slow-moving urban systems which we nostalgically recall, like the

towns and villages, have grown first into large cities and metropolises, then into interconnected conurbations and now into megalopolises. It is within the same 150 years that mankind has, without really understanding what it was doing, engaged in building settlements larger than any before, in its 8,000 years of city-building history.

Obviously, we must now learn more about this strange setting in which we find ourselves. Moreover, our knowledge, as our work, must be integrative; we must build on and with the know-how that already exists in various disciplines by “borrowing” that which pertains to human settlements. If we continue to do what we have been doing in the past, which is to look at these problems merely from the point of view of any one isolated discipline; if we continue to look at the problem mainly from the point of view of what hurts us most at the moment — then we will only create problems.

*Professor **Gottmann** reinforces the view that we must consider wide areas if we are to gain understanding of the large urban systems under discussion.*

We should realize that whether the area from Windsor to Quebec City is continuously urbanized at present, is not important. We still must study the area as a whole in order to understand and provide for the entire system, as it evolves and develops. The idea of the system as a whole, with an inner relationship and outer relationships, has considerable value for planning and for carrying out our actions within a given urban system.

*To the question of “How do we get a handle on it? How do we control it for the better instead of letting it explode uncontrolled?”, Professor **Gottmann** answers:*

First, people have to understand what is happening. Secondly, they have to understand that if it is happening, it is not simply because a few people wanted to speculate, but because there are deep trends in the evolution of society, which bring about the concentration of people. We are not able to recognize all these trends, although we can at this stage point to some of them. There are fewer people needed on the land; so there has been an exodus from the farm. The exodus has also affected the small towns that used to service the population of the countryside — look at what is happening to the smaller towns of Saskatchewan. The same process is slowly coming not only to mining, but also to manufacturing, because it is getting automated and fewer people are needed at the places of production. So what do they do? They gather in places where they can find not only jobs, but all kinds of services, excitement, and great choice of opportunity.

*Finally, Professor **Gottmann** points out that the complexity of megalopolis must not preclude the development of solutions:*

Studies of the megalopolitan phenomenon cannot get away from the extraordinary complexity and ensuing difficulties arising in such a region. But it is necessary to strive for solutions even in such environments. Once we accept that the complexity and the diversity are integral parts of the great face of complementarity between all the pieces of the mosaic that resulted from the process of growth and concentration, it should be possible to establish solutions on the foundations of plurality and complementarity.

5.3 Megalopolis Seems Unmanageable

*There is no time to waste. The necessary knowledge must be acquired, not in isolated study, but within a process which is integrated with action; because action cannot be delayed while waiting for theories and perfect answers. Professor **F. Kenneth Hare** leads off the discussion, followed by Professor **Jean Gottmann**, **Margaret Mead** and **Alexander B. Leman**.*

The study of the institutional complexity that man burdens himself with, will quickly demonstrate the impossibility of any progress whatsoever and it will also demonstrate the impossibility of solving every problem. But in spite of the complexity, ultimately, most problems get solved. The reason for this is that in the long run the obstructive and the uncooperative are outnumbered and gradually we move forward. People ultimately get sick of an unnecessary situation and then gradually, not a consensus but enough agreement emerges so that we can begin to make some progress.

On the international issues specifically, we do have a long history of consultation between the U.S. and Canada. The International Joint Commission is one of the primary manifestations of that progress. The IJC has had a long history of successful and reasonable solutions within a restricted power framework. It has been able to persuade the two countries to do sensible things. It will go on doing so. It has recently been given new jobs in this area of environmental quality and I think that gradually things will sort themselves out.

I am a believer in the art of muddling through. I do not believe that one can lay out for anything as complex as the human quilt, a geometry or a design ahead of time. But I do think they tend to emerge.

*In response to a question whether we are seeing the revival of city-states **Gottmann** replies:*

We are not seeing the reintroduction of city-states. No, I think the problem is completely different. There are a number of political considerations in the governance of a megalopolis, such as on the Great Lakes or the sector of megalopolitan growth here in Canada from Windsor to Ottawa — perhaps

soon to Montreal and Quebec City. There is a narrow strip of land on which there is an enormous concentration of population by Canadian standards, and that area's population is growing much faster than any other part of Canada. Metropolitan Toronto alone from 1966 to 1971, between your last two censuses here, added more people than the three provinces of Manitoba, Alberta and Saskatchewan, plus the Yukon and the Northwest Territories together, despite all the endeavours of Canada to settle people in those areas. That creates great political problems, as the megalopolitan area is thought to concentrate too many people, too much wealth, political power and so on from within the national system. The federal government, therefore, assumes that it is supposed to do whatever it can to decentralize and diffuse such concentrated growth.

Are we then improving our ability to manage and control the problems which arise through the rapid urban concentrations? No, we are not! One of the reasons, is that we do not want to control change, in the way which would truly improve the conditions arising from and within such concentrations. Every government that has a great concentration of a very large metropolitan or megalopolitan size settlement, tries to decentralize it, to scatter it, and therefore to make it more difficult to accumulate, agglomerate various things in such fast-growing places.

Mead: And all governments have failed so far.

Gottmann: They have all failed in controlling growth. However, in most cases they have succeeded in making the conditions that stimulate such large aggregations, worse!

Mead: We must realize that now, as for the past 150 years, the process of human concentrations is here; and what should be enhanced is a recognition of what exists, a recognition of this concentration as a reality, since no form of government has so far succeeded in dispersing and decentralizing these large urban agglomerations.

Gottmann: To some extent and at a considerable effort and cost, they do help some other, outer regions to get a little more of the growth, and that is perfectly all right with me. Governments should help declining parts of their territory to improve, but they should not fail at the same time, to help conditions to improve where most of their people are congregated.

Leman: The major issue here, is of course the role of governments in managing the growth of large, urban systems such as the GLM.

That governments everywhere and at all levels, try to avoid population concentration and urban agglomerations can easily be explained: the best way to cope with some problems is to avoid them! Governments, being only human, do what other humans would do — they search hard for an escape.

Efforts of governments to “decentralize”, “deconcentrate”, and “stimulate growth in outlying regions” are often induced by their inability to cope with the problems caused by the rapid rate of change in large urban centres.

Westward migration of man has been going on for a few thousand years now; first from central Asia to eastern Europe, then to central and western Europe; then to the eastern shores of the Americas, including Jean Gottmann's megalopolis; and at last, when in the fifties and sixties of this century, humanity reached the Californian shores in wave after wave, it can be said that the great westward migrations of man came to a sudden end. The twentieth century will be remembered for that. This is another “big pattern change” which we can add to those of which Bucky spoke earlier.

We now know that there is “Only One Earth”,¹ as Barbara Ward and Rene Dubos, as well as the moon astronauts, report.

There is nowhere else to escape any more. Thousands of years of “Go West, young man, Go West!” of “moving on elsewhere” after we have fouled up “here” — have at last come to an end. For awhile, the governments and others, will wring their hands and urge that “they” (that is, others than you and I — and maybe even you!) should go and live elsewhere; then, it will become general and public knowledge, that we have “run out of the west”, that there is no more “elsewhere” and that we must now try our best to make our cities, all of our settlements, a safe and a happy place for us and for those who follow.

That major issue is, after all, what this Symposium is all about.

5.4 Wealth and Power of Megalopolis are Resented by Outsiders

Concentrations of wealth, knowledge and power are always resented by those who are not sharing in them; those on the outer fringes of megalopolis, or even far outside of it, are mistrustful of what such concentrations will mean to them and to their well-being. Megalopolis draws — as does the village or town — from the surrounding area, to create wealth and power, not all of which is then equally shared with those who are outside of it. The principle is not new — but the form it takes, is: the impact of such a process is both more concentrated and affects larger areas than ever before. Professor Thomas A. Seliga discusses the facts and implications of this topic.

There are really different scales of human and other interactions, and I think that that is what ekistic scale definitions are all about. Scales of human interaction ultimately have different types of ramifications on individuals.

Speaking as a physical scientist, I would say that there are also different scales of physical interaction, and I see those as being relevant as well, particularly in environmental matters.

If we look at megalopolis, we see that it is a power structure, ultimately an important power structure. Megalopolis itself is demanding upon our natural resources, wherever they may be. This is well exemplified in this morning's news discussion of the major pipeline which goes from Alberta to the east, all the way to here, feeding this large megalopolis in Canada, transporting millions of barrels of oil daily, yet over the last few months there have been six or seven major pipeline breakdowns causing, to some extent, irreparable damage to portions of Canada and the United States.

Similarly, in last night's news, we saw the new pipeline into Alaska which as an artery, feeds or is going to feed the megalopolises of the United States. The city of Fairbanks, Alaska, is today experiencing the up-to-now unknown and entirely unpredicted environmental problems. Today, air pollution is a serious problem in Fairbanks because of the tremendous increase in traffic. Closer to home, in the Ohio River Valley, there are enormous industrial complexes, chemical, electrical-generating complexes, steel complexes and others, feeding the megalopolis. As I see it, as technology develops its capabilities for delivery over vast distances, we are going to find ourselves in a situation where the arteries feeding megalopolis are essentially of no political consequence.

I also foresee that megalopolis will easily take care of its own green spots, of its local air pollution problems, and its water pollution problems — but it is not going to be too concerned about the arterial networks which feed it. This, I believe, is an extremely important problem and I can see now why the environmentalists are so concerned about the pipelines in Alaska; are so concerned about the transmission of oil and gas via pipelines or about the transmission of energy over large distances on extremely high tension power lines and power grids. This is in essence part of what Doxiadis was talking about in his paper, and I think it is an important issue that ought not to be overlooked in examining megalopolis. The people who are at the source or along these feeding networks reside in small places and are of small political influence; consequently there is a responsibility on the part of the power structure within megalopolis, to protect and not to disregard the interests of those who feed it, however far away they might be.

In addition, because the corporate and governmental bodies that utilize these resources and determine the location of major arteries, do not reside in those areas, they are, to a great extent, totally unaware of the local problems they are creating.

5.5 Spatial Imbalances Cause Concern

The thinning out of population from the vast areas within nations with large territories — Canada and the U.S. are good examples — causes concern at the national level particularly. Professor Maurice Yeates shares such concerns, as he comments on the future migrations within Canada and the flow of immigrants to the already highly-urbanized areas.

The resulting pattern of urbanization in the year 2001 as predicted in Figure 22 is primarily the product of inter-regional migration within Canada and the quite particular destination of immigrants outside the country. The result of this is that the population of Canada in the year 2001 would be focussed primarily in the Windsor-Quebec axis, and secondarily in British Columbia.²

The problems caused by such spatial imbalances are many, particularly in federally-structured states such as Canada and the U.S.A. where the constitutional structure itself is endangered. Neither Constitution anticipated such sudden and enormous shifts in population distribution and ratios. Professor Jean Gottmann discusses some governmental responses to the emergence of large urban concentrations:

The usual response has been to decentralize and scatter offices and quaternary activities. This has been attempted in several countries by different governments: it has been official policy for London, Paris, Amsterdam, Zurich and many other large cities. Moving the seat of national government away from a primate city, as was done in the seventeenth century in France with Versailles and in the Netherlands with The Hague, since 1800 in the United States, Canada, Australia, South Africa, more recently in Turkey and Brazil — were all endeavours in the same direction. These moves expressed mistrust by the governments of the powerful impact on national politics of the cosmopolitan and turbulent mixtures of interest inherent in the dynamics of the large cities operating as hubs of far-flung networks. Plato had already objected to such cosmopolitan trends in ancient Athens.

5.6 Environment that Debases Human Condition

When the natural environment is debased, neither the man-made environment, nor man himself is saved from debasement. While issues of the human condition in megalopolis are considered at some length in Chapter 3, the section that follows considers primarily the natural environment itself.

Nature is never “in balance” to the extent that it is thereby static and does not change; in fact, constant, systematic change is the manifestation of

nature itself. So long as man built his villages and hamlets — even his isolated towns and cities — he disrupted nature's balance little, if at all, moreover, his technology dictated that his actions be generally compatible with, rather than defiant of nature.

Dr. F. Kenneth Hare discusses the implications of the serious disruptions of the natural balance, when man interferes with nature at the vast megalopolitan scale, over a long period of time.

The Great Lakes system is indeed unique. It is an opportunity for man; it is also a remarkable challenge. It is an environment that has altered in its appeal to man, during the three hundred years of our exploration of the continent. Yet, there are certain things about it which hardly change at all. Many aspects of nature have been swept away or fundamentally altered by the disturbing action of man. So let me start with the water bodies themselves and the streams that feed them and are fed by them, because there would not be a megalopolis here if that water system did not exist. As opposed to Lake Ontario, Lake Erie, having little depth and the largest concentration of megalopolitan population around it, has been the lake on which the impact of pollution and of human disturbance has fallen most heavily.

Mining for Clean Water

Suggestions have recently been put forth, that the way out of the dilemma in the future is to make extensive use of underground water reserves for intensive urban use. It strikes me as being ridiculous, however, that in a region with this tremendous surplus of surface water, one should be put to the expense and technological complexity of using ground water. We are, of course, already doing that here in Ontario: there are new municipalities right outside of Toronto which are dependent upon ground water almost within sight of Lake Ontario. The possibility that one could in fact greatly increase the flow of water through the Great Lakes system by the diversion of surface water from the Hudson's Bay drainage system is, of course, one suggestion that has been espoused for a long time. I can certainly see many objections to taking this course of action, but it is a possibility. One could in fact substantially accelerate the flow of water through the Great Lakes. My firm belief, however, is that there is absolutely no reason that there should be any problem at all with the quality of water in the Great Lakes system, if reasonable management practices are followed by municipalities and by farmers alike; and I do not believe that it is beyond our wit to keep or restore all parts of the Great Lakes system to full usability. We should aim at this, rather than turn away from the Great Lakes, in search of other solutions.

Air Pollution

The Great Lakes Region happens to be that part of North America which has the highest probability of confluence of air streams, from the southwest to the northwest. In some parts of the atmosphere, one has a naturally dispersive sort of situation; here we have a naturally non-dispersive situation. That is one point that we must keep in mind. It happens that the Great Lakes lie near the principal, frontal zone of the westerly belt for most of the year and this tends, for example, to bring a higher degree of smoke into the eastern Great Lakes region.

The second point is that because the Great Lakes themselves are cold for part of the summer, they tend to stabilize the atmosphere and create what is from a world basis, a highly unusual situation, of a maximum of air pollution in the summer.

The third point to keep in mind, is that the presence of the Great Lakes in many ways, acts — to use the jargon of the system analyst — in a "counter-intuitive" sort of way. Most people guess that the Great Lakes are responsible for the humidity here in the summer. In fact, this is not the case. The Great Lakes tend, if anything, to somewhat lower the water content of the atmosphere because they are colder than the moist air that passes over them. What we have here, then, is a rather special situation.

What are the interactions between this kind of natural distribution and the networks that the society is concerned with — the overall performance of this megalopolitan region? First, I should point out that this is a convergent water system which has massive problems of pollution. It is also a convergent climatic system, but only to some extent; this is why the winds over the Great Lakes tend not to disperse, but to concentrate the air pollution. The flow of the wind is to an unusual extent, confluent over the Great Lakes, and the St. Lawrence system, at most times of the year. I can also assure you that the fog over the Great Lakes does in fact diminish the solar radiation income of the region quite substantially. It follows that we have a management problem of the first magnitude in the environmental domain.

Deterioration of Forest Cover

The Great Lakes system was once unique and had certain natural characteristics that completely set it off from the rest of the continent. One was the forest cover that once stretched from Minnesota to Quebec. It was a forest, remarkably different from the great deciduous forests of the eastern United States. The Great Lakes-St. Lawrence forest was dominated by sugar maples, and by three types of softwood trees that played an astonishing role in the economic history of the continent. In descending

order of importance they were: the white pine, the red pine and the hemlock. A large part of the early settlement of Ontario and Michigan, beyond the lakes, and into northern Wisconsin and Minnesota, was undertaken particularly in search of the white pine. The white pine was a softwood of extraordinary versatility, the best softwood that had been discovered to that date. That forest has been utterly destroyed; there is not a single acre of it left. What we have instead is secondary growth and fossil-remains.

We can reconstruct what it was like. One white pine for example, taken out of a bog near Sorel, in Quebec, can be estimated to have been 275 feet or 80 metres high. It was in the same league as the big conifers of the western forests. But today when you look at white pines — and they are still abundant — they appear stunted and diseased and the reason that they appear this way is simply because they are indeed stunted and diseased. We have not only cut out all of the pure white pine without exception, but we have also permitted the spread of the intermediate host of its principal parasite and so it has been decimated by the work of man. Not only has the condition of the pine deteriorated, but there is literally nothing left of what the forest used to be. The rapacity with which western man descends upon a virgin forest when he finds one is a story which I still can only tell to my students with a carefully controlled shudder.

Schism or Symbiosis?

I understand that Leacock was once asked to give an economic opinion concerning the feasibility and the desirability of the St. Lawrence Seaway. His answer was quite simple and characteristic. He said: 'To hell with economics, it's a magnificent conception, and it's got to be built.' Of course that is essentially the way we have tended to treat these problems in the Great Lakes. We have generally not been able to arrive at any kind of economic consensus as to desirability of any major measure to alter the natural system in favour of what we see as the economic future. Yet, though we have not generally achieved that consensus, we have in the end tended to achieve results. Whether they have been beneficial or not is a matter of conjecture. I have put before you the interpretations that a natural scientist puts upon the map. But no natural scientist can be oblivious to the impact that urbanization, and economic development make upon his natural systems. Nor I think, if he is sensible, can he regret them, as long as they are as rational as the mind of man can make them.

Professor Thomas Seliga discusses the immense and varied scales at which man affects air quality within and beyond the GLM:

Man in megalopolis affects air quality with cars, electrical polygenerating plants and industrial activity. For most problems in urban centres throughout the world, it may be sufficient to work in three dimensional physical space.

The atmosphere introduces a new complexity, that is, it is a fluid which superimposes a flow over the earth's surface, thus introducing a fourth dimension of time into the care for megalopolis. Air pollution problems, like the weather, follow similar scales of size and time. We see the problems ranging from a localized scale of the order of a few kilometers or less, to thousands of kilometers.

The supporting energy structure of the United States tends to use the natural resources of coal and water along adjoining riverways particularly in the mideastern central part of the United States. This great industrial activity is within easy access of the Boston Washington Megalopolis and the Great Lakes Megalopolis via water transmission lines.

In considering megalopolis and air pollution we see that there are three primary relationships that need to be accounted for. First is the intra air pollution problem, associated with activity within megalopolis. Second is the extra air pollution problems associated with supporting networks that are beyond the megalopolitan region but provide materials and energy for megalopolis. Third is the transport of pollutants from regions distant from their source, be they intra or extra megalopolis sources.

Using the Ohio River Valley as an example, I would simply state that there are some important social and political problems, caused by immense pollution within a small area for the benefit of vast megalopolitan systems. We have a great tributary that is in effect feeding the needs of megalopolis, yet the local people are paying dearly for this feeding. There are naturally some economic benefits to be derived, but at the same time they are not able to cope with the huge environmental problems associated with the great amount of industrial activity along the Ohio River. I believe there are some special moral obligations on the part of the large urban centres towards this particular situation.

With respect to the Great Lakes Megalopolis, the problems range throughout the entire scale, from small regions within the megalopolis to the much larger scale problems of the entire megalopolis structure. The largest scale problems would occur primarily during periods of anticyclonic activity where we have much stagnation of air, primarily during the late summer and fall of the year, and during those periods of time we would tend to have a large cloud hovering over this large area. There is some evidence now to show that the Boston Washington Megalopolis has this same problem; and it has another problem in that there are times when the air pollution transports itself out over the sea and then at another time during the day will come back in and essentially reinforce new pollution being emitted in that particular location.

We have found then, that there are three associated problems of air quality in GLM: the intramegalopolis problem, the extramegalopolis problem, and the large continental or global problem where areas far away from GLM are affected by the needs of this megalopolis to function and breathe. I have touched on some social, political and economic issues associated with air pollution problems; they are all of major importance and warrant careful consideration and examination.

John G. Papaioannou *comments on a specific issue:*

I would like to repeat my concern about the disappearance of the beautiful orchards between Hamilton and St. Catharines in Ontario. That could have been prevented, but wasn't, because the people responsible prefer the profits they make on urbanization, to conservation. If this issue is viewed on a broader scale, to assess what is good for the whole of Canada, it is easy to conclude that the issue of whether Canadians will eat peaches grown on their own soil or depend entirely on imports, is a national issue that impacts on the megalopolis, and is not merely a simple issue for individual orchard owners to decide.

5.7 Political and Moral Dilemmas

Every day, decisions having an impact on GLM are made by various governments at different levels; yet, if "the man on the street" is wronged or disagrees, or simply wishes to contribute toward building a better world, he has no-one to turn to, no-one to blame or to praise. If he asks: "Who is in charge here?", everyone or no-one will answer; it depends on what the next question will be.

While it may well be better, that there never be a megalopolitan level of governance, this issue has not yet been properly addressed.

Dr. Spenser Havlick approaches the problem of governance from the "grass-roots" citizen-involvement level; Alexander B. Leman, James Beatty, and Robert Reed enter the discussion.

Havlick: The Great Lakes Megalopolis may provide some chance for region-wide citizen involvement but the obstacles will prove difficult to surmount. There are commonly shared resources like water, air, some minerals, various networks of communication and transportation. I expect that whatever progress is made will be made in those categories.

The GLM, as any megalopolis, lacks an effective incentive system for public involvement and participation in the planning process. There is nothing comparable to political plums, because megalopolis has no officially

recognized political boundaries or specific legislature. It has no profit incentive for involvement as does the private enterprise system, and no rank incentive as in a military organization. In fact, there is an increasing number of disincentives for citizen participation at the megalopolitan level of government. Some of these are:

- 1 The development of useful public policies at a megalopolitan scale depends upon the understanding of an educated and informed public. The complexity of environmental quality management on a regional scale challenges the most sophisticated pollution control agencies no matter how superb their software and hardware in cybernetics and analysis might be. The problem of sorting emotional and physiological perceptions of air pollution even in a metropolitan area is extraordinarily difficult.
- 2 Distance and available time provide increasing obstacles for direct citizen participation in a megalopolitan planning process. Even though the megalopolitan or national decision process may have greater individual impacts, citizens tend to spend more effort and more time on issues involved with dwelling groups, small neighbourhoods, neighbourhoods, small towns, towns, and large cities. With improved networks, videophones, and other technological devices to ease the time-space problem, the lower and modest income individuals could be priced out of the citizen participation process as is so often the case with national and international public decision making.

Leman: In the last 200 years, we have rapidly and rather successfully evolved the democratic system of government — not only in the U.K. but on more or less a global scale. This is so, because some years ago, there was a revolution in France proclaiming three major principles of "liberté", "égalité", and "fraternité", that have guided mankind's popular movements ever since. I know that I am treading on dangerous ground, because I want to discuss "égalité", which has been the cornerstone of the evolution of our democratic system; the system which has evolved to a point where we now have such terms as "grass roots", "participation at the citizen level", "citizen involvement in the decision making process", and so on.

But I also think that we have overextended the concept so much now, that we are beginning to mislead the "grass roots", the "man on the street", as to how much effective influence he can really have in the decision making process.

Here are the tensions which are evolving: on the one hand, there is the lone man on the street, who "walks the sidewalks" on Toronto's Yonge Street, and may well be without adequate education, without particular intelligence,

without proper understanding of the world around him, but who is nevertheless, imbued with the impression that he, being “the citizen”, has equal rights like anyone else; on the other hand, we have these large, complex systems like megalopolis, which defy even the competence and capabilities of knowledgeable people from a variety of disciplines. Serious tensions then begin to evolve when our “lone man on Yonge Street” demands and is even induced to demand a role in the decision making process, but having gotten it and having made some decisions, finds that nothing really changes.

I think that the time has come to tell our man on the street that someone is fooling him — by telling him to go and get involved, without having devised the means to make that involvement effective.

Someone should tell the man on the street, that regardless of his participation in democracy, there will be at least three or four times as many people on earth as there are now, before we begin to level off; most of them will stream to the large cities and vast agglomerations; most people will continue to prefer the Great Lakes, the Mediterranean and California to Timmins, Ontario — and most importantly, most of the major decisions will increasingly be made “at the top”, because most of our problems in the next two or three generations will be at the complex and sophisticated level of the large urban systems.

Someone should tell our man on the street some of these things; otherwise, he is likely to get frustrated by pulling the not-connected lever at the grass root level — and this frustration may well lead him to turn the tables on “participation”, by turning away from democracy, to extremes, politically.

Mead: Alex, you know of the work on the United Nations University now being set up in Tokyo, Japan, whose one stated goal is to explore this kind of problem.

Taylor: That is an important point. In Ontario, we have concluded that one of the major problems we must solve is the one of government structure, at the large scale, the regional scale and the subregional scale. We have made some progress in this particular direction which, I would suggest, some jurisdictions may wish to look at. Up until about 10 years ago, we had about 3,600 educational jurisdictions in Ontario. That has been reduced over the last 10 years, to something like 60. There are close to 900 municipalities ranging all the way from 100 people with little capability of responding to any problems, to the large metropolitan municipality. I think that some of the approaches we have taken in establishing regional municipalities and in reducing the number of jurisdictions, provides a much more rational basis for strong local government activity, including the participation of the individual citizen, and provides for a much more rational basis upon which

local governments can respond to their own problems within a local, regional and megalopolitan scale.

Beatty: What’s broken down, is the trust in others. The people on the street have ceased to trust the people who say they are acting on their behalf.

A growing frustration of the people in the street is rooted in the impossibility of finding who is accountable for what they think has gone wrong.

Our strategy must be not to attack anybody but rather to lay the issues out so that those who are called upon to decide the future of the megalopolis know that as the alternatives are presented, their particular area of accountability is defined. If that is done, there will be a growing confidence by the people who must elect, that they don’t need to understand the total technology, but they will have people who will be a bridge from that technology to the role they must play. And this is where democracy becomes positive; people can identify with it, have a stake in it, and they can observe the results of action. I think that there is a tremendous opportunity for democracy because there is no other field where you have a better chance to see where your decisions are well done and where they are well communicated.

Reed: Consistently I have heard this “rational man” argument involved in economics, which is my background. It took me a couple of years to realize that man is not an economic, rational animal, which the theory says he is. Now I hear a ring of the rational man argument in a different framework, in an urban setting or in a settlement setting, rather than an economic setting; but the distinction is not that different. I hear there is a new rational man argument saying that man is governmentally rational. I would hypothesize that going toward a megalopolis scale, planning becomes less a structure process, building things, and more planning perceptions of how we view our environment. Going towards the McLuhan information flows concept, you really go towards planning people’s perceptions and not the structure; the structures come later.

I would hypothesize that current effort in planning is getting the information to the man on the street. Where is that reverse flow, the one about getting the information from the man on the street into the planning of perceptual realities for the future? I do not see that.

I see that a real problem in remaining democratic in our idealism, is to allow a wider influx among people — and not institutions — in defining our future perceptual realities of where we are going; not the buildings we are going to be in so much, and not environmental steps, although they are certainly important, but in trying to plan out what we are going to perceive as the future.

In the meantime, regardless of whether or not there is a good and responsive structure for citizen participation other than the existing governance systems, decisions have to be made daily; not easy and simple decisions, but the ones that often mean a binding commitment; otherwise we are building with late-spring snowflakes.

S.B. McLaughlin, Professor **Jack B. Ellis** and Professor **Earl Finbar Murphy** develop some thoughts on the process of perceiving the future.

McLaughlin: Do we have the right to tell people — people today, and the future generations — how they may live? I think that is really the question.

My answer is yes. Moreover, since I think we can take it for granted that there are going to be more people, we will be making decisions for many more people than there are today. It really doesn't matter much at present, whether it is the 6.7, 10, 15, or 35 billion that we talk about at "full maturity" of planet Earth. And it doesn't matter much at present, when we reach that "full maturity", whether in 2275 or 2500.

The battle as to whether we should plan or not has been won, and what we are now concerned with, is whether planning is going to be a kind of manipulation and if so, are we fully aware of what that is doing to our liberties? What are the methods that we can use to retain some of the important values, while we plan for change?

Ellis: There is no such thing as a mature state.

I think that actually it is inconsistent to think of a mature state as the way to plan. I think that's inconsistent with the desire to not lock ourselves in, or freeze our society. I think that if you look at the potential that we have not yet discovered, within ourselves, within our environment, within our ways of organizing our networks — potential to achieve better things, that probably the last thing we should think of is a "mature state" plan. It may be mature in certain senses, it may have used all of a certain amount of resource or it may have got it down to some asymptote, but I think the potential is unlimited and we will never hopefully achieve a mature state in what you might call the intellectual or the psychic or the creative realms that spring from within the individual. It is not strictly based on the individual, because there are many more qualified people here than I am to say what happens when individuals get in groups and how the sum of what comes out can be much greater than the individual contributions of the parts.

Murphy: I don't know if it is at all helpful to answer the question "have we any right to bind the future?" I do not even know if it is fruitful to ask if we will have the responsibility for binding the future. But we will bind the future, as the past has put constraints upon us. Henry Ford once said:

"We will solve the problems of the city by leaving it." I don't think he had the right to say it and since he's dead he doesn't have the responsibility, but even in that, he had a profound effect on what we have now as the problem before us.

As a lawyer, I am concerned about the rule of law. I recognize that it is possible to have a culture like the Chinese one, that does not exist under the rule of law but exists under a rule of administration. But a long time ago, western civilization, which is only an extension of Hellenistic civilization, made the decision to be governed by the rule of law, not by the rule of men. And so this becomes a matter of grave concern to us.

5.8 Obsolescence of Power Politics

*One of the "hidden ground" issues in every consideration of urban problems, is the obsolescence of the political structures and processes available to a given system. **R. Buckminster Fuller*** explicates his views on the obsolescence of the principles under which the global power-politics operate today. Professor **Marshall McLuhan** finds human bodies obsolete due to technological extensions of man living in the electric world; and Professor **Earl Finbar Murphy** appears in a role of transmitter, between the "electrically conceptual" and the "real ground".*

Fuller: Long ago, I became fascinated with the question of politics, and realized that politics on our planet arises from the long, long history of little, tiny man, locally struggling to get on. Some were lucky, found a good place, but the majority did not. They were continually finding themselves impoverished and dying of famine in great suffering. We then have humanity believing throughout history that there did not seem to be enough of fundamental life support needed to take care of everybody. Therefore, we have the appearance of the leader who says: "Follow me and things will be better. I will get more. I will distribute it more evenly, more logically." Sometimes by force, sometimes by wisdom, but we always had leaders saying, "come my way in view of the fundamental inadequacy."

The great pattern of economics and of politics is fundamental inadequacy. Up to 150 years ago, people were isolated, and thus oriented locally, and they had no real concepts about the total world. There had been great empires, Alexander the Great's, the Roman and so forth, but these amounted to less than 13 percent of the surface of earth. In the nineteenth century, we had the British Empire which controlled three quarters of the earth, and made enormous wealth by integrating remote resources and commanding the sea lanes.

*R. Buckminster Fuller of University City Science Center, Philadelphia, Penn.

The Great East Indies Company established the East India Company College in England, where the professor of political economics was one Thomas Malthus. His was the era of the British Empire, the first empire on which “the sun never sets”; the first empire of humanity after Magellan had circumnavigated the globe, and Drake was the first Britisher to confirm it. Thomas Malthus is the first economist in the history of man, to receive the total vital statistics from a closed system. Up to this time, the earth had been an “open plan”, going to infinity; all the empires were civilizations presumed to go to infinity, and if they went to infinity, there was an infinite number of opportunities for everybody — if you prayed to the right God, and followed the right Emperor, you were going to come out all right! Everybody had hope. Suddenly, Thomas Malthus, in his second book in 1810, concluded that quite clearly the statistics show that human beings are multiplying themselves at a geometrical rate but are producing the goods to support themselves only at an arithmetical rate, and man is quite clearly destined to be a failure. Pray all you want, it doesn’t do you any good; that’s all there is, there isn’t any more.

This is a fantastic conclusion! However, this information did not get to humanity at large, but only reached the ears of the masses of the “water ocean world, the masses of the British Empire, who by then had another great man taken around the world. Darwin was taken around the world with other biologists and geologists, because as scientists, they could look through their microscopes and see resources which could be exploited, resources which merchants could not see. His findings were simple: these are all the living species, classified and sorted out. In order to explain the design of the evolutionary events of biology, he developed the theory of “survival only of the fittest!”

We then have the great mass of the “water ocean world” being told by a great economist that there are not enough resources to go around; and by the great scientists, that survival is only for the fittest. So they concluded we must be the fittest because we are in the saddle, we are in control of things. On the other hand, Karl Marx reading both Darwin and Malthus, agreed that there is nowhere nearly enough to go around; and that a survival is assured only of the fittest, but he said quite clearly that the worker is the fittest. He knows how to handle the tools; how to handle the stone and the wood and the metals; these other people are parasites — and the grand schism of modern times was born.

So these are the two great extremes, but their common basis is: there is not enough to go around. This has been the official basis of all the political ideologies since that time, and it is on account of it that I have often criticized the United States, Russia and China for putting an average of \$200 billion

a year aside, over the last 20 years; in fact, in recent times, amounts of up to four trillion dollars have gone into taking the highest capabilities of man and focussing them entirely on the kill. This is an absolutely incredible waste, fortifying the theory of waste, that there is enough to go around. If it hadn’t been for this kind of wasteful effort, you could never have maintained the theory that “there is nowhere nearly enough to go around”!

More with Less

If this is true, obviously the next challenge was how to make what you have, last longer and do more. So I remembered my navy experience in World War I, when I realized that when a warship encountered an enemy ship at sea, he who could shoot further, with the same tonnage, did more! How does one do more with less? This was the most highly classified type of information; and still is.

In the light of this, the more I thought of Malthus, the more I recognized that Malthus did not know that we were going to have refrigeration; he did not know that we were going to take tin and put it on thin sheets of steel to make cans. He thought that the food that was growing “here” would never reach the mouths “there”. He thought that if you were going to get messages from across the Atlantic, you would have to send a ship. I found that with a few hundred pounds of material, I could send my message, and many, many times faster at that. I then began to ask myself: “What did Malthus leave out?”

Malthus left out of his calculations the factor of change, the change which comes about through a combination of time and human intellect.

Back in 1917, I felt that someday, we might do much with little, that we might be able to take care of everybody; that the basic dictum of all politics might be invalid. I said that to myself seriously in 1927, and that is why there are now a hundred thousand geodesic domes around the world, enclosing space for about one percent of material, for a given snow load, compared to conventional buildings; that is why I now know, and was saying the other day, that it is feasible to take care of the energy needs of all humanity by 1985, at the same standards we enjoy here in Canada and the United States. We can live on the energy incomes. We now know how. With the resources we already have mined, refined and have to work with, with the knowledge which we already have, we can now take care of all humanity, at a higher standard of living than anybody has ever known. That is why I do know that power politics are now obsolete.

Governing Humanity's Affairs

I predicated my statement on the obsolescence of politics, on the history-long assumptions that there would never be enough to go around, that humanity was really designed to be a failure, that we have to prove ourselves as exceptions to the rule if we were allowed to earn a living. I saw half a century ago, there was a possibility for man to do more with less, that there was a possibility that someday we might be able to do enough to take care of everybody. I know now that this is actually feasible. Therefore, I can make the working assumption that we do not have to have power politics, that we do not have to have the parties always backed up with a gun, the threat that only one side or the other is going to survive. So I am saying that the principle is obsolete.

I would like to at this point, indicate some of the ways in which I see that humanity's governance of its affairs may be readily resolved. I am convinced that, at the time of the founding of the American and Canadian governments, the whole method of representation was predicated on the representatives going to a central meeting place by foot or by horse, as this was the fastest they could possibly go. They came to their central meeting place — whether it was in Washington or Philadelphia — and at that time, it was often true that Jefferson would say to his Cabinet: "If we don't get a letter from our ambassador Franklin in France this year, we'd better write him a letter."

Since that time, in came the telegraph. We have today human beings innundated with information on political issues, events and personalities, yet they have only a chance to respond every four years when they go to the polls.

But let us look at the future and the potential it brings. One of the most fascinating fields of research that is going on, started off with the veterans in hospitals who were perfectly willing to have electrodes put in their heads, and the researchers found that they were able to identify, first, energy output coming from the brain and then, the dream patterns. Today, they have actually been able to identify fields of response, a positive and negative attitude of human beings which is now electronically identifiable. There is nothing even mildly strange to think that as we are able to pick up certain information with our sensing equipment, we will be able to really find out what the positive and negative response of all humanity might be on any question. It could be in split seconds. I think that this is probably the way things are going to go.

We will have the disposition of humanity on the problems in question, and answers will be electronically recorded. We will know at any time, what the majority is saying about anything. Then whatever the majority wills at the

time, management is going to have to carry out. But the minute that management moves on the wrong course, and everybody sees it, the immediate response of the majority of the world is going to be that we have to turn around. There will be no scapegoating of the old political way. I can see that humanity is probably going to make some big mistakes; but at the same time, the majority will probably be much more effective in guiding the corrections to these mistakes.

The main thing to remember is that in achieving a better world, let us not be impatient.*

McLuhan: I am not pretending to be able to clarify what Bucky has said about the obsolescence of politics, but there is another way of putting it, namely that there is "obsolescence of people." At the speed of light or electric speed, there is a sense in which man becomes discarnate, his body is not important any more. He moves everywhere instantly as information. Now quite apart from that which is a literal state of anybody using radio or telephone, the sender is sent on telephone or TV, the sender is actually sent physically as information. This is a dimension which politically compels us to consider ourselves as mythic beings, that is, moving no longer in the representational political sphere, but actually as myth makers; only not verbally inventing myths, but living myths.

We are in a sense superhuman beings moving at the speed of light with electric power and creating patterns of change in our communities at such speed that they can only be likened to mythic activity. Politics have taken on the character of mythic form. This does not mean unreal or fictitious, but actually a corporate myth. A myth is a pattern involving a great body of people but apprehended in an instant of time. When you perceive a big pattern of change in an instant, you are contributing to, or participating in a myth. In the twentieth century we do live mythically, whether we know it or like it or not; and I personally do not consider it an ideal situation. It simply happens to be the way it is; necessary therefore to be understood.

But consider it as the successor to political representation. We are discarnate, instantaneous, angelic beings living in mythic patterns, have therefore to invent completely new forms of political power and responsibility. It is an incredible prospect — or immediate situation in which we actually live. As Margaret Mead said: "Somebody better turn something off right away," when I mentioned this to her. I think yes, if there were some way to turn off our electric services long enough to get our breaths or to get back to a human dimension, this would be desirable. But I do not myself know of any means of turning off that switch, just to become human again.

*R. Buckminster Fuller of University City Science Center, Philadelphia, Penn.

I do not think that, at the present time, people on this planet have a human dimension anymore. They are superhuman beings. The kids' dream of superman has come true and it is a completely fantastic realization of a comic strip dream. Politics of the human scale are a thing of yesterday, and I do not consider this a desirable thing or a fulfillment of anybody's dreams.

But I am happy to concur with Bucky's observations, which nonetheless indicate only the beginning of our responsibilities. What is to succeed human politics, if people are already obsolete?

Murphy: I do not think that it is possible to say of comments such as Mr. Fuller's and Mr. McLuhan's, that they are wrong, because they may be right.

But I do not believe that because we are getting instant reaction from the public — and by that fact alone — politics will be dead. I spend too much time in academia involved in politics, to think that merely because the decision does not matter, there will not be politics involved with it. I do feel that, to go back to Marshall's point, it's too bad we can't pull the plug. Well we can't; but we can erect buffers and I think much of the bureaucratic structure is designed to serve as buffers in this electric universe. Insulators and many of the transfer payments that are being made are designed to serve as insulators so that while we can't pull the plug, apparently society does believe it can — rightly or wrongly — develop insulation against electric shock.

6 What are the Means?

However “rapid” urbanization might be, there is still time to act; not much time, to be sure, but nevertheless, there will never be more of it than now.

The problems and issues abound — and there are more to come. Yet, some of the basic premises on which human actions were based, are now obsolete. Big pattern changes made them so.

Most importantly, the problems and the responsibilities can no longer be avoided, cannot be passed on to anyone, neither in time nor in space, not even to other governments!

What, then, are the means?

Are not the means better governance of megalopolis? Not a particular government, but the action of governing. Some would call it better management of growth, but governance of megalopolis requires the attention not only for and during the growth period, but also for its continuance. Some of these considerations are discussed by Professor Earl Finbar Murphy, Professor David W. Fischer, Professor George R. Francis, Dr. Margaret Mead.

6.1 Governance

6.1.1 Is Megalopolis Governable?

Murphy: Is megalopolis governable? Is it wise to follow the suggestion briefly touched upon earlier by John Papaioannou that there should be an administrative cordon drawn several miles beyond the actual limits of megalopolitan activity so that there would be a kind of planned zone within which the planner would have some freedom of movement. I do not think that Papaioannou meant that we should create something called The Great Lakes Megalopolitan Government, with delegation of authority to it by the United States and Canada and by the province of Ontario and the seven American states that immediately join the Great Lakes. I think he sees megalopolises, each one growing into another, ultimately forming a grid pattern. So that if we were to create megalopolitan government, it would be necessary eventually to split it up for purposes of local governance, even upon a macro scale. What he may mean is to show that a megalopolis grows, if you are going to have effective action planning, it will be necessary to do more than plan for the area of immediate urban dominance.

Forms of Governance

Traditionally, we have had simple government organization, when we had an agricultural and small town economy. Of course, I am not talking about the village economy, nor am I talking about a subsistence agricultural economy; I am talking about that kind of agricultural economy which has always been dominant in North America and which became dominant in western Europe as trade was revived, namely agriculture for market exchange. And with that kind of organization, you had basically a three tier system, with the township and or borough at the bottom, the county at the intermediate level, and the state or central government at the top. It is not, then, an adequate system for a long time, as first metropolis and then megalopolis spread out and imposed themselves upon what had previously been rural or small town environments.

Late in the nineteenth and early in the twentieth century, an effort was made to create small, general jurisdictions, to take account of this gradual expansion of urban form. Suburbanization was the result. For purposes of conserving land use, preventing the wastage of resources and the use of nature as a universal sink, suburbanization has not been successful; but it has produced the fragmented system that we see, a system so fragmented that one cannot effectively find in almost any of the urban areas, governments that truly have power over communities that represent production, residents and all the other functions that go on within metropolitan or megalopolitan area.

Increasingly people are now talking about two-tier government, namely, doing away with all forms of local and municipal government, and replacing them with regions — being a little indefinite as to the size of the region — and then having a strong central government. In the United States, sometimes (but not always) they concede that the states should survive as an intermediate form.

Direct Representation

Some of the people who are deeply involved in cybernetics, are suggesting that we scrap all local and representative governments for a series of plural executives who would communicate directly with the people to find out what was wanted. That is, they would use a series of terminals and programs with which they could communicate directly with the people and

they would put proposals to the people, the people would react to the proposals; or they would put questions to the people, the people would make input to the terminals and we could therefore completely dispense with political structure, representative government and all we would really need would be some expert managers and the people. This of course assumes that the people have a continuing, detailed knowledge and interest in what the executives would want information on or decisions about. It further assumes that the process is not subject to manipulation and abuse by the expert executive and it also assumes that views obtained in this way enjoy the same intensity or exchange value as views that are forged in conflict or in the negotiations that terminate conflict.

I myself am dubious about this proposal for the latter reason. When I am sitting at the breakfast table at seven o'clock in the morning, I am Archie Bunker. As I develop during the day, I may reach the intellectual and moral level of his son-in-law. But to say that I am at any of these points capable of participating in this kind of interaction with government, is not meaningful until I am put in the heat of decision and told that I have to make a decision which will expose me, which will put me under attack and which will compel me to make concessions. Then, at that point, I think I can become a useful decision maker. Otherwise, I am reacting with prejudice and grinding my teeth at the television camera.

We are all aware of certain failures of government, traditional government; the three tier failed, the two tier has not been tried and I think will not be tried in all probability. The cybernetic system has not been tried; if it is tried, it certainly will not be used in that detailed form but a somewhat broader type of plebiscite will be used. Or of course, we can have a centralized form of government, with all budgeting, all tax revenues concentrated in the centre and then distributed out to the localities. Indeed, one of the reasons that we have so many problems at the local level is that it is local government which is on the firing line and which must first come to grips with the problems of our society. The intermediate and upper hierarchical forms of government are insulated from pressures. This is one of the reasons they often look so good compared to local and municipal government.

Single Purpose Agencies

One of the proposals that has been put forward to solve certain of these problems, is the single purpose government agencies. The idea is to give a particular agency, a wider area of service than any existing general municipal jurisdiction could have; to so establish it that it can communicate nearly as an equal with upper hierarchical levels in government, without having to move responsibility up the line and by doing that, risking the loss of the

particular function in the larger responsibilities of a more general unit. In addition, these agencies are given single missions to perform and the experience with them has been that they do their single missions rather well, if, the single mission that they are given is truly a single mission, and if they are given sufficient powers to mobilize credit in order to perform that single mission.

Where do their problems come from? Why have we not found them to be so universally successful that I can come to you today and say, "It's solved, megalopolis will be governed by single-mission, area-wide agencies." It seems to me there are three reasons. First, concentrating on mission causes the agency to not be able to perceive other areas of need. And as it becomes more and more successful in its single mission, it becomes the source of a problem and not the means to a solution. Secondly, the single mission agency is an agency that is normally difficult to penetrate in order to produce any kind of public accountability. I am talking not about the participation of the people, but simply about reports filed somewhere and accessible to somebody who could then ask a few questions, even if that somebody were a state controller or some other equally bureaucratic personality. And thirdly, because you create single mission agencies, with overlapping jurisdictions, as you must inevitably do, you are contributing to the further fragmentation of bureaucracy and to the increased fragmentation of a system that already is suffering from over-division.

Now what makes them desirable? Again I have three reasons. First, once agreed upon, they can accomplish purposes, not subject to veto by fragmented constituencies. That initial stage of getting the agreement may cause great political perturbation, but once the agreement comes, however it is induced or however it is done, thereafter it is not possible for narrower constituencies to veto the actions of the single-purpose agency. Secondly, they are excellent for providing, at public expense, the facility infrastructure which the individual units in the market require, but for which they ordinarily cannot mobilize the capital for the reason that they could not fully amortize the cost of what they need in infrastructure out of their own incomes. Thirdly, the special purpose agency is an excellent vehicle for handling the increasingly important transfer payment of benefits from those who are receiving the profits of a high energy culture to those who otherwise could not be sharing in them.

Special purpose authorities are no panacea for megalopolis therefore, but they have valuable limited uses. Megalopolitan planning and doing must be at a larger level than city, county, or metropolitan government. But it need not necessarily all of it be on a megalopolitan-wide basis. States and federal governments may intrude into the megalopolitan growth structure to pressure for open space and to prevent the sort of differentiated growth

which is consuming the one most limited product that we have, namely, space — whether that space be the space on land, on water or in the air.

There are raw forces at work within megalopolis which government and politics ignore at great peril. Government cannot totally remold a megalopolitan growth any more than a psychoanalyst can totally remold a personality. There is a constitutional basis that will resist such remolding, and indeed, we should be fortunate that this is so, because if megalopolis would be so malleable and so simple to remold, we might find ourselves through planning error in an even worse situation than we have been assured exists and is likely to exist.

If we view the Great Lakes Megalopolis as a connected unit, we cannot expect to first form a joint, international, North American government to manage it. I agree totally and completely with Doxiadis that if we have to wait until a constitutional convention for North America is called, that by that time megalopolis will have reached such a state, that we will no longer need to do any planning about it. But, portions of megalopolis are subject to management and are indeed in a fragmented way, currently being managed.

Conclusion

What is needed is greater management and coordination of that management. Air and water cannot be planned in isolation from land and I do not think that urban uses can be planned in isolation from agricultural uses. I will give one illustration. We are engaging in Ohio, in expensive experiments in no-tilling agriculture, designed to make the plow obsolete. It is working quite well in the Muskegan Valley; unfortunately for the Great Lakes, it is not working in the Maumee Valley. The reason being that the Maumee Valley has a heavy soil, and it is necessary to first put in a crop of rye to absorb the moisture, before you can put in your cover, through which you drill. And, people are not creating a demand for rye.

Ultimately perhaps, we will have to have larger governmental units. I think however, they will come with the creating of government units, not as prescriptive units created in advance, but as summarizing units created to give public expression to social decisions that have already basically been agreed upon and have been carried out to a considerable degree before you have the kind of consensus that could produce a new institution.

I believe we could use the Joint Commission; I believe we could use the Great Lakes Commission, with changes of course. But I think that we have got to move now, because if we do not move now, if we wait as we have done with metropolitan government — and we wait as we seem to be doing

in many, many areas on megalopolitan government, the next time a meeting of this sort gets together and begins to think basically, they are going to be talking about ecumenopolitan government and people are going to be saying: "Ecumenopolis, who needs it? Ecumenopolis, it doesn't exist and never will."

6.1.2 The Actors within the Process

If action is to ensue, who then, are the actors? Professor David W. Fischer, while addressing the problem of developing a framework for evaluating the Megalopolis Assessment System, presents a comprehensive matrix of "actor classification", actors' roles and issues clarification.

Few places can be said to escape the present concerns over megalopolis with the socio-environmental milieu. Comprehensive assessments, whether of technology, environment or institutions introduce the important dimensions of "By whom, using what methods and for what purposes?" It is necessary therefore, to examine not only the informational components of assessments but in addition, those social systems that are involved in such assessments.

For purposes of a comprehensive analysis of programmes and actions having an impact on megalopolis, it is important that the concept of actors be construed broadly to include not only those who create and develop a particular development program, but also those who are ultimately affected by it, as such developments become embedded in society over time. This too emphasizes the need to consider consequences or impacts other than direct ones.

The assessment system is useful in attempting to evolve strategic and operational plans for governing institutional change. It is hoped that concepts like actors, information, decisions, strategies and issues cast in a dynamic assessment system framework, will further our understanding of global multiparty and multidimensional energy systems.

It is essential to understand that the approach used is not an attempt to model the megalopolis assessment system. Rather, it is designed to create a framework for analyzing that assessment system, i.e. to assess the assessors. This distinction is vital.

The assessment system includes actors, issues, information base, information flows, relationships among actors, strategies and decisions. For schematic purposes, and as a representation of the sequence of analysis, Figure 24 depicts a simplified model of a megalopolis assessment system analysis.

By examining an assessment system in this way, one can observe multiparty and multidimensional processes. The Ekistics grid developed by C.A. Doxiadis

is an example of a framework for observing such processes. The technology assessment system provides a supporting framework from which to undertake such an analysis.

a) Development Program

The initial step in the analysis is the identification and description of the various components of some specific development program of megalopolitan importance. For example, eight broad development activities can be identified:

- Reconnaissance
- Consolidation
- Planning
- Development
- Infrastructure
- Marketing
- Sales
- Abandonment/Redevelopment

b) Information Base and Flows

The ease with which the development is conducted is in large measure related to the availability of a host of services and facilities often provided by governments as they seek to encourage development.

It must be emphasized that the development program and the supporting infrastructure must include the consequences or impacts of such activities. It is only when these impacts are also taken account of that a reasonable assurance exists that the list of actors is a comprehensive one.

c) Actors

Actors refer to those who are in one way or another participants in an assessment system; i.e. they are "involved". It is useful to identify the degree of actors' involvement.

In addition to involvement, it is useful to identify actors in terms of their favorability or value orientation to the development program and issues at hand. From a knowledge of such attitudes, it is possible to identify cooperative and competitive or rival relationships among actors.

Figure 24 **Megalopolis Assessment System Model: Assessing the Actors in Megalopolis**

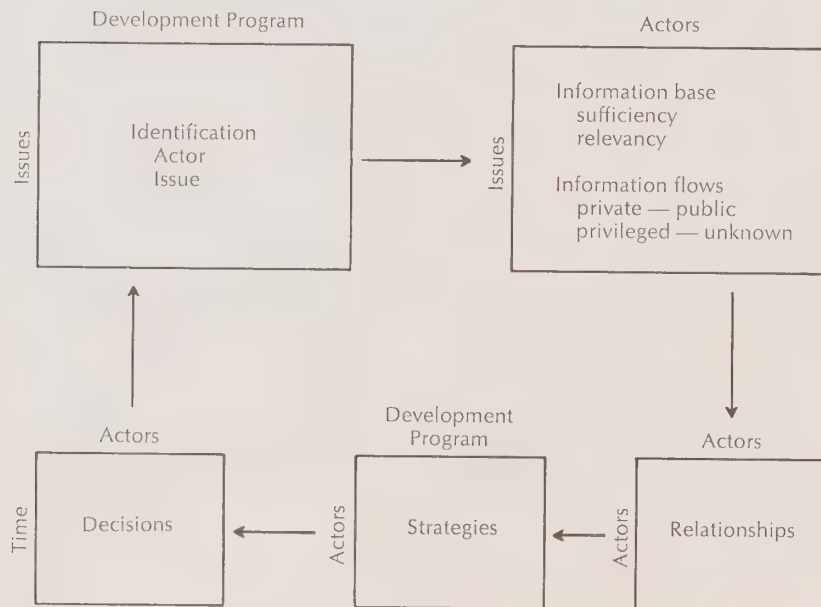


Figure 25 **Actor Classification Framework**

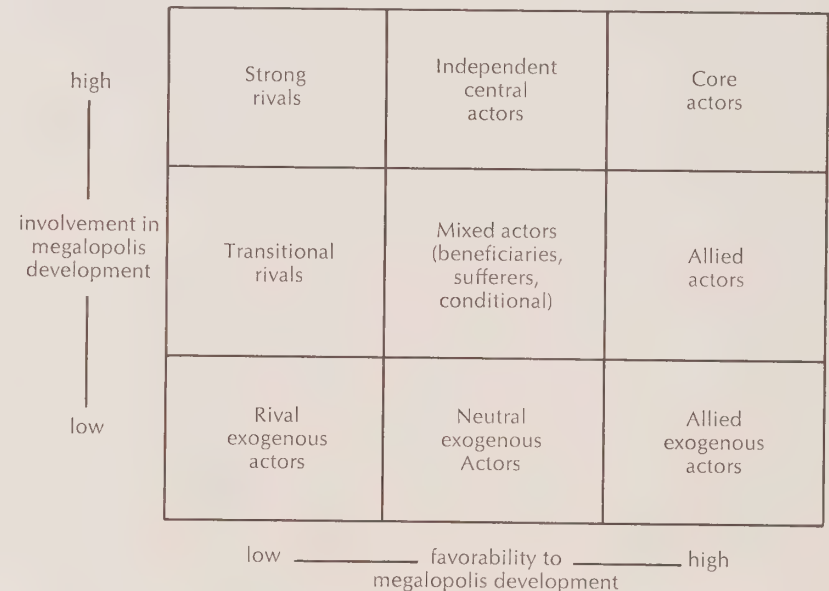


Figure 25 depicts the actor classification framework. The right-hand column of the framework represents actor groups with varying levels of involvement but all being positively or favorably disposed to the development program. As the degree of involvement decreases, the specificity of the supportive relationship will likely change from intimate knowledge of the development activities on the part of core actors, to more generalized supportive value orientations on the part of “allied” and “allied exogenous actors”.

The centre column area of the framework represents a “mixed” or middle range attitude or value orientation.

The left hand column of the framework consists of those actors opposed to the development program, the adversaries and rivals. Rivals and adversaries may demonstrate varying degrees of involvement; however, even those peripheral to the megalopolis assessment may significantly affect the system and the development program.

In order to clarify the actor classification framework, a description of each actor type follows:

Core Actors: This group has continuous and intensive involvement in the technological development program. Though other actor types may make fundamental decisions, it is usually the core actors who initiate a program via one or more fundamental decisions.

Allied Actors: These actors are characterized by a positive or favorable orientation to the development program. Their activities enhance the development program.

Allied Exogenous Actors: Two types are suggested.

- 1 Those actors who have definite links to “allied actors” and “core” actors and who though geopolitically distinct from members of the technology assessment system may indirectly and significantly control their actions (e.g. multinational corporations)
- 2 Those actors who are characterized both as marginal to the development program and have supportive or favorable attitudes to the program

Independent Central Actors: Actors of this type are seen to have a degree of independence or autonomy from both the proponents and adversaries of a given development program.

Mixed Actors: This actor type has moderate involvement in the development program and attitudinally may have both pro and con orientations to the development or may be neutral.

Neutral Exogenous Actors: These actors are seen as exogenous to the assessment system usually for geopolitical reasons. Like “independent central actors”, they have an independent or autonomous role due to constitutional or legal factors.

Strong Rivals: Strong rivals are characterized for the most part by having developed viable alternate development programs within the megalopolis. Strong adversaries might include political organizations who may be central to the development program in terms of power but ideologically opposed to the particular technological-economic program mix.

Transitional Rivals: This group of actors consists of those who for reasons of expertise, power, resources and information have only moderate involvement and are declared rivals or adversaries of the technological development program. Not only may actors be emerging as rivals or adversaries but also, given a fundamental decision against the prevailing program, a former “core” or “allied actor” may shift to rival or adversary status while those who were formerly rivals and adversaries assume “core” or “allied actor” status.

Rival Exogenous Actors: This group of actors is seen to be outside the assessment system, certainly in its day-to-day, week-to-week functioning.

d) Issues

Two basic issue orientations have been identified. The first of these might be referred to as substantive issues. By this is meant that set of issues which emerge from the nature of the development in the megalopolis. The second aspect of issues concerns the assessment system processes or “roles”. Such issues will reflect its inadequacies in terms of involvement of actors, quality and flow of information, decisions, and strategies and their resultant effects on the nature of the assessment itself.

Substantive Issues

Substantive Issues are many and may be categorized in a variety of ways. For purposes of megalopolis, five substantive issue types are identified:

Technological
Environmental
Social
Economic
Political

Technological issues are seen as those problems which arise when the limits of a particular technology in its interaction with environment or man have been reached or surpassed. Such situations often give rise to technological adaptation or innovation or even abandonment of the program.

Environment, social and economic issues are conceived to encompass broad time and space dimensions. Political issues refer to jurisdictional or multiparty conflicts which may be localized or extend through regional and national spheres to the international scene.

“Role” Issues

Role issues derive from the structure and functions of the actors in the system:

- Actor issues; an example of which would be the absence of certain actors from the system, i.e., “should-be” actors.
- Information issues; examples of which might include barriers to the information flows and limitations in accessibility as well as deficiencies in the kind and quality of information available.
- Decision issues; examples of which might include the existence of highly centralized decision-making prerogatives, overlapping actor decision-making loci, the absence of formalized decision-making authority or responsibility for certain issues and the relevance of information to decisions.
- Strategy Issues; examples might include instances of cooptation, cooperation and coercion.
- Overview comprehensiveness as an issue; which refers to the extent to which the collective assessments represent all the major dimensions of the program or problems which are at issue.

e) Strategies

An analysis of the nature and development of relationships among actors is very much at the heart of a great deal of “strategizing”. Two general strategies are identified: 1) consent building and, 2) conflict containment, both of which represent interactive modes of planning.

Consent among actors may be achieved by command, bargaining or persuasion. The strategies followed by each of the actors form and reform the issues in the megalopolis. As the issues shift, changes in both actors and strategies will occur.

f) Decisions

By distinguishing fundamental from incremental decisions, it is possible to account for major changes in policies and programs.

Fundamental decisions are characterized by major shifts in policy relative to an actor’s primary goals or major investments in projects or programs. It may also be useful to characterize fundamental decisions as general or somewhat abstracted decisions (rather than particularistic or detailed) which affect a relatively large organizational space over a considerable period of time.

Incremental decisions are those of a more specific and limited nature which are both antecedent and consequent to fundamental decisions. As actors “scan” their environments for opportunities and maintain on-going programs, decisions of an incremental nature may be made. Subsequent to a fundamental decision a host of new or different actions may be required which derive logically from the fundamental decision. These too, may be characterized as incremental decisions.

g) Conclusion

A major debate in any megalopolis is how to respond to development pressures based upon perceptions of actors in the assessment system. The present megalopolitan programs assessment system appears to be characterized by a set of reactive actor policies that have not only failed in their aims but have proved inconsistent when arrayed among the actors comprising the system. Such reactions have not led to greater interaction but have instead remained uncoordinated and inappropriate and have led solely to individual actor consolidation and isolation. Interactions among actor groups have remained stunted and cautious at best. No one-time policy decision will wrest the actor groups into a harmonious and constructive interactive process.

There is no question that the fundamental need is for a system of continuing review with well established and consistent principles of coordination. We propose that a framework similar to ours be used to investigate each existing or potential development program of importance to megalopolis. The assessments of the assessment systems surrounding each megalopolis can then be detailed to obtain the actors, issues, information, actor linkages, decisions and strategies.

From these experiences, specific suggestions can evolve for adjusting the system via strategic and operational planning concepts. In this way, the governance of megalopolis will have begun.

6.1.3 Boundaries can be Useful

Boundaries are usually thought of as obstacles; the discussion that follows illustrates some of their positive and quite useful aspects, seldom considered before.

Murphy: I want to take up the value of division in government because we have had a great deal of emphasis on the need for unity in government. I want to be specific to the Great Lakes Region and speak of the fact that there are two national governments within the region. I want to address myself specifically to the valuable function which an independent Canada performs in the Great Lakes Region.

It is easy for citizens of the United States not to understand the valuable service to them, that a strong and viable Canadian nation to the north, provides. In the organization of the Great Lakes, if Canada had been the fourteenth colony, rather than an independent nation, the development between Detroit and Toronto might have been much stronger than it is and we might have already had the type of development on the northern shore of the lakes that we have on the southern. Windsor, instead of being a rather small suburb of Detroit, might well have been a second Detroit.

On the other hand, if that had been so I think that our situation would have been a more perilous one than it is today, because we have the advantage of Canadian pressure, fairly continuous pressure to improve the quality of air and water in the Great Lakes, since much of the pollution of both is coming from the American side. Having Canada means that we have the advantage of a different form of government on the northern shore of the lakes, a more centralized form of government, more able and willing to direct activity than the one on the south, or at any rate, more willing to direct it openly and directly than is the case on the south.

I therefore want to urge a greater creation of joint enterprises between Canada and the United States. I think that we have to realize that the fact that two nations do share the Great Lakes, may not be a cause for alarm, not a problem that has to be overcome, but actually an opportunity that may permit us to save the lakes and may permit us to have a better megalopolis than if a single, national entity were on both sides of the Great Lakes system.

Mead: You always have an opportunity, when you have a governmental boundary to assess the sum of the effects of the governments on both sides, and get some notion, therefore, of what changes need to be made now, for each and any programme to obtain improvements in an urban system. Of course, the line between Canada and the United States is one of the most useful lines in the world for purposes of understanding systems: we speak the same language in both the GLM-C and the GLM-US; we have virtually the same climate; we all speak something called English — or a reasonable approximation of it, and we can understand each other, to a degree at least.

Yet, we have these extraordinary things that stop at the border — the United States has 10 times the homicide rate of Canada, for example. Unfortunately, you cannot blame it on the climate; you cannot blame it on changes in the magnetic field from the sun; you cannot blame it on big cities because there are big cities on both sides of the border; and you cannot blame it on immigration — but one thing you can blame it on, is the number of guns per person.

Canada represents that strong person in a community who doesn't catch the flu. We all know that there are strong people who usually survive a few

epidemics, but if you get enough people sick, the person who does not catch the flu, catches something else; and I think that that is a pretty fair statement of Canada's position today — Canada is free of a great many of the ills that exist in the United States, and it probably will not get exactly the same ills, but it will get some others, unless we take North American action to prevent them.

6.1.4 Beginning the Process of Governance

Professor George Francis, through his paper, brings a historic dimension to the consideration of international programmes within the GLM. He shows that there is a record of some achievement, then brings forward a specific proposal for future action.

The Natural Basin Context

One aspect in the governance of the Great Lakes Megalopolis is its natural environment base, especially the Great Lakes themselves. While the geographic area embraced by megalopolis only directly overlaps the lower half of the total Great Lakes Basin, it does nevertheless exert considerable influence over much of the entire basin, the more northern part of which can be seen as a kind of immediate hinterland to the megalopolis.

The impact of the Great Lakes Megalopolis on the lower lakes embraced by it — that is, lakes Erie and Ontario, much of Lake Michigan and part of Lake Huron — has become of widespread concern. Large as these lakes are, they are showing signs of environmental stress. This has been dramatized by the announcement of the dying of Lake Erie, which, although not a helpful way of understanding the dynamics of accelerated eutrophication, does sound the alarm over the rate at which biophysical changes are occurring in water quality and the life dependent on it.

The demands of population and industrial growth around the lakes, increasingly become evident in the form of resource management problems related to the water and associated land resources of the Great Lakes Basin. These include lake level controls, shoreline protection and development, water quality, fisheries management, the provision of industrial and municipal water supplies, electrical power generation, the needs of commercial navigation, water-based recreational uses and so on. While the problems show up in the water, they are generated as consequences of land-based activities and thereby become related to land use management issues as well. Pollution in the Great Lakes has been acknowledged by governments in both Canada and the United States since 1912, and since 1875, there have been 27 commissions and conferences which called

attention to the declining fisheries and the need for uniform control measures.

What is relatively new, is the growing realization that many of these resource management matters are interrelated in ways that are neither well, nor easily understood. Yet they will soon have to be understood, given the implications of the insights into the future that the studies of ekistics, among others, give. With rapidly growing demands placed on the water and associated land resources of the Great Lakes Basin, there is little doubt that there will be more conflicts among uses and users of these resources and a growing together of the different problem sets in ways which will make management issues more difficult to resolve. In addition, given the increasingly pervasive and diffused transboundary effects which can also be expected, it is no longer feasible to assume that Canada and the United States can resolve these resource management questions without greater cooperation.

Thus, one integral feature of governance for the Great Lakes Megalopolis regardless of the form the governance may take, has to be some arrangement for the management of the Great Lakes resources, an arrangement which provides for: adopting as a working perspective the Great Lakes Basin itself as the ultimate planning unit; more concerted and sustained efforts to analyze and understand the interrelated nature of the water and land management problems and the policy issues they raise; and the development of anticipatory planning capabilities as part of the governance function for the express purpose of tackling problems before they reach crisis proportions.

Existing Institutions

This, however, still leaves the question of how this particular aspect of the governance function is envisaged. There is already an impressive institutional structure in place for governing the Great Lakes Basin, consisting of two federal systems which meet in the middle of the lakes, so to speak. The resource management functions alone are divided among two federal governments, eight states, two provinces (when the St. Lawrence System is included), many local municipalities and special purpose local authorities like the Ontario conservation authorities. Each level of government has responsibilities relating to land and water use divided among a number of agencies. Coordination is a recurring problem, although important initiatives have been made especially by the Great Lakes Basin Commission on the United States side, and through the Executive Agreement on Great Lakes Water Quality, administered by the International Joint Commission, a key organization in water management of the Great Lakes.

“Management” Functions

“Management” in this context encompasses three distinct functions. First, the function of monitoring or surveillance strives to give a wider measure of awareness of what is going on in and around the lakes by gathering information and data systematically and regularly. Secondly, a mediation function resolves differences of perception or interpretation of problems by informal discussion. And thirdly, a coordinating function controls some factors through regulatory authorities in both countries.

To some extent with water management, all three functions are being performed in the Great Lakes on a binational basis, but this is largely ad hoc in response to particular technically defined questions. There is as yet no formal provision for maintaining a continuous watch over the whole Great Lakes Basin with the broad futures-oriented perspective already referred to, in order to identify problems before they become unmanageable, look at future alternatives and opportunities, exchange ideas and experience among various jurisdictions and groups for coping with emerging situations and mobilize a concerted binational response.

An appropriate organizational structure would require two complementary components. One would be a joint basin-wide policy and planning body, which is politically responsive primarily through federal, provincial, state and citizen group representations. The other would be a network of regional or lake-basin management agencies, responsible for implementing the appropriate monitoring and mediation tasks, within the overall policy guidelines established by the basin-wide policy body and which would be closely linked with provincial, state and local government agencies.

The main question seems to be whether the IJC should be asked to shoulder additional functions and responsibilities or whether, bearing in mind that the IJC has responsibilities along the whole Canada-United States boundary, a new binational body should be considered exclusively for the Great Lakes.

Conclusion

What is the significance of all this for the question of governance of the Great Lakes Megalopolis? First of all, it has to be looked at as a process which will identify those parts, functions and aspects of megalopolitan systems that are capable of being influenced, redirected, inhibited.

Second, in spite of the impressive amount of government already at hand around the Great Lakes, it is not realistic to expect initiatives reflecting the scope and the scale in which they need to be conceived to come from within governmental institutions. Granted that the highest of political levels are an exception, nevertheless they are too preoccupied with the immediate

and the urgent. For any given administrative agency, the initiative would carry implications reaching far beyond its jurisdiction or organizational mandate.

Third, the place to start is in organizing a process to initiate the process. I would like to suggest that this might be done best by non-governmental working groups which draw upon knowledgeable people from both Canada and the United States to join together in a symposium to open up the issues which governments in both countries find hard to raise. Once the issues are opened, in a neutral forum, professionals from government agencies can informally contribute a great deal from their first hand experiences and should be closely involved in the process.

Recommendations

I would like, therefore, to propose that you follow up this Symposium with a working group devoted to this theme of governance of the Great Lakes Megalopolis. This would not only provide the occasion to pull together on-going work by ecologists and others who analyze megalopolitan phenomena, but it should direct attention to the policy implications and issues, and the present institutional arrangements for dealing with these. I would anticipate this would then raise the question of institutional modifications and change as well, and perhaps at that point the two groups could engage in a useful exchange of views. That may be a good time to bring forth discussion of the future directions for Great Lakes Megalopolis to a wider audience, in more visible formats.

6.2 Nature and Megalopolis

6.2.1 Water Management

The natural environment is liable to suffer from megalopolis more than from any other type of human settlement; in fact, it already has. The oldest and perhaps the most important concern within the GLM is the water of the lakes and of their tributaries — as Dr. F. Kenneth Hare points out in his paper. Dr. C. Ian Jackson illustrates, on the other hand, that nature as a constituent element of megalopolis, requires innovative means of governance, which are already within our reach.

Hare: I have mentioned two countries, but I haven't mentioned the provinces and states. Look at them: Ontario and Quebec in Canada, Minnesota, Wisconsin, Illinois, Michigan, Ohio, Indiana, Pennsylvania, New York, and Vermont in the U.S.A. if you include the St. Lawrence system down the river;

then add to that the municipalities, which on the American side of the border are quite distinctly less tributary to the states than Canadian municipalities are to the province. There is a maze of jurisdiction and of course a much more complex maze of private interests, all of which have something to say about the use to which the water will be put, and many of us who have approached that task in the past with quite remarkable indifference or irresponsibility.

In the last 10 years, we have had to begin the process of discovering techniques whereby the system can be brought under control. There is in place now, a Great Lakes Water Quality Agreement, which at least suggests an effective mechanism of cooperation between the two central governments and the key state and provincial administrations that have to fit in with this. There is in place, on both sides of the border, a network of institutions with varying degrees of official sanction, to bring about coordination of the state and provincial policies with those of the federal governments on both sides. And, increasingly there is a body of legislation or regulation on both sides which makes it possible to bear down on the less responsible private users of the water. But it is a process that has as yet hardly begun.

We tend to hold it up as a model, for example, to the Europeans who have not yet succeeded in doing this with the Rhine or the Danube, but those of us who have been at all close to this, I think, would make no claim for it other than that the first step towards comprehensive water use and planning has been taken. The Great Lakes system will take a long time to achieve something like the standard of water quality that was there before we came.

The tradition of international consultation in this question or this type of question of course, goes back to an earlier problem, the problem of navigation. The water bodies have to be managed as a single system if there is to be free shipping navigation on the lakes system. We have on each side of the border, distinct and separate sets of institutions concerned with this. But they have learned to work together effectively. By comparison with arrangements in other parts of the world, the navigational systems on the Great Lakes are advanced and furthermore they are quite old.

In the larger issues to which this society addresses itself the question of urban growth, development, the development of the communications system made necessary by human settlements, the development of the grid, the network of power installations required, the sheer getting of any kind of grip on the incredible migration within this region, this is something toward which we still, I think, have to grope. It is not really in either of our two political traditions to do this. But because urbanization in North America has focussed so extensively upon these shores, upon this constricted region, we are being gradually forced into it.

On this side of the border, we now talk about the Windsor-Quebec axis. To some of us, those of us who were born and bred in North America, it looks like a dangerously congested strip of Canadian territory, posing all of the familiar problems of the other megalopolises along the Atlantic shore. To some of us who were brought up in Europe, it looks like an amazingly empty piece of territory still, where problems exist mainly in the minds of academics. Which side you take in that is up to you. But of course on the American side of the border, the concentration of population is substantially greater, and the impact it makes upon the water body, the water system, correspondingly greater. The problems that have to be confronted are rendered inconceivably greater by the jurisdictional complexity which is the special burden of the United States.

Finally, I think it is worth pointing out that to some extent, this system is international in a broader sense, than simply a joint management problem of Canada and the United States. Ever since the building of the 14 foot canals, which goes back to the nineteenth century, through the St. Lawrence River, ocean shipping has reached the upper lakes. It's true those were little miniatures, but the building of the St. Lawrence Seaway opened the lakes to intermediate sized shipping. Of course, foreign countries have made extensive use of this and a large number of foreign ships sailed the lakes, primarily, to get access to U.S. harbours. So, the world as a whole has had a stake in the free navigation of these waters and we have long felt that this was an asset to the two owning countries, an asset that should obviously be safeguarded.

Jackson: The Canada Water Act has its imperfections but it is innovative and is working. The reason I mention it is that legislatures were told firmly, by the scientists, that there is no point in trying to tackle water unless you tackle it comprehensively and there's no point in trying to fit it into pre-existing political units, you must take the physical boundaries of water management systems; and the legislation is innovative because it does this. It caused a lot of problems, but it is beginning to work. Like Dr. Hare, I believe that if scientists and others say firmly enough, this is the way to do it then ultimately the legislators and the administrators will listen.

Murphy: We have water planning now which we didn't have a few years ago. When the Water Resources Research Act of 1964 was passed in the U.S., that was the beginning. When we passed our Water Quality Amendments Act of 1972, that opened up major possibilities for planning. Society seems to be in the process of defining that what it wants to do is to take a more integrated, comprehensive approach to its problems rather than a more segregated, isolated, fragmented approach. Consequently, we are seeing government respond to that pressure and to that demand.

Having followed planning for the Great Lakes from at least 1967, when I first attended the third Conference on the Great Lakes at Ohio State University in 1967, and spoke on a plan for administering the environmental problems of lakes Erie and Ontario, I have seen in the eight years tremendous strides forward in the direction of integrated, comprehensive management of the problem. So I think we ought not to think as if we were the pioneers, meeting for the first time on the issue of a comprehensive development plan and action in relation to the Great Lakes.

6.2.2 Restoration of the Eco-System

It is not enough to merely prevent further damage; much restoration will have to be done as well. Dr. F. Kenneth Hare comments:

I am not sure that we ultimately must create genuine reserves in which nature alone can do the job of restoration, but we will not, for example, get white pine back until we can, in certain areas at least, remove the black currants which white pine does not tolerate. But we shall never be able to rebuild the ecosystems in their original form.

The reconstruction of devastated ecosystems, given this pessimistic view is based upon our current thinking but we believe it is possible, and we know that it is possible to go back to a far healthier condition for the woodlands than is characteristic of the Great Lakes Basin today. This is elementary to the forester; it's only that the forester has never been given the go-ahead to do it.

6.3 Networks are the Key

At the megalopolitan scale, in a given natural setting, networks are the key to land utilization and land protection. Dr. C.A. Doxiadis, Don Taylor, N.D. Lea, Professor Earl Finbar Murphy and an Unknown Observer discuss the implications.

Doxiadis: Only an organized expansion leading to a successful Great Lakes Megalopolis System can save nature and people in the best possible way. The question is what kind of organized expansion is best. To answer this question constructively, we must conceive the total number of alternatives, classify them systematically and then select the best.

Such a test effort has led to the following preliminary conclusions:

- 1 No single theoretical approach can really serve the entire area. For instance, the new towns approach can lead towards good solutions in specific cases, but it is completely excluded over the whole Great

Lakes Major Region scale, because even by the year 2000, it would spread the area of urbanization too much and become very expensive. At the same time, it would not solve any of the problems of the existing cities.

- 2 No single overall plan can be implemented because there is no authority or group that can handle it.
- 3 The only alternative which can really help the whole area to develop towards a desirable and feasible megalopolis is to give each of the urban systems and rural areas a maximum of possible choices for their own plans.

The research carried out so far shows that the best alternatives are to create a total system of coordinated transportation and utility corridors serving all parts of the states and provinces in the area. This opens the widest range of possible choices to all parts of the megalopolis, leading to a more desirable future.

These transportation and utility corridors offer many advantages:

- 1 The corridors should unify the completely uncoordinated systems of highways, railways, airports, and ports into one "LANWAIR" (land, water and air system.)
- 2 All public utilities should be incorporated into these same corridors.
- 3 The transportation and utility corridors should cross the countryside in such places and in such a way as to give the maximum of choices for the location of industrial and central commercial areas.
- 4 The new transportation and utility corridors need not touch the existing urban systems so that local citizens have the choice of the best possible connections for their own areas.
- 5 The corridors should cause the minimum harm to attractive landscapes.

Conclusion

The best alternative is one which can guide the development of the Great Lakes Megalopolis System as a whole and give maximum choices to each of its parts. This can transform it from a problem area into an area of highly desirable living conditions.

Taylor: In Ontario, we are making some preliminary approaches to coordinating major regional networks. There are two situations which may be of interest: one is known as the Parkway Belt System, which is now being developed around Metropolitan Toronto within what we call the Toronto Centred Region extending from Hamilton through to Oshawa. The Parkway is about 140 miles long, and one of its functions, is to provide

a common corridor to contain interregional utility systems, including high tension, hydro, transmission facilities, major interregional road systems, rapid rail systems, pipelines for gas and oil and integrated with this, we hope, we can develop a system of open space which can integrate the north-south open space system which is so prominent in the Toronto region, to develop a better recreational open space.

We expect that this system will be developed in legislative form with the necessary administrative structure provided by the province, through a designated provincial agency empowered to acquire the land and lease it out to the individual public and private agencies that need space.

There is another such system developing between Nanticoke, a new major industrial system on the north shore of Lake Erie, and Hamilton, and subsequently to Toronto.

Unknown: When a plan for network corridors such as the one proposed by Doxiadis is introduced, it is not expected that it will replace overnight, the maze of various networks. The method by which this would be done is a gradual one and I believe it could start by getting each provincial or state government to adopt the plan for some of the major axes and then gradually add parts of the network as opportunities permit, so that little by little the new system of networks replaces the existing maze.

Murphy: The American Public Works Association has been pushing actively what they call the utilidor. The idea is basically to take the interstate highway system which has tremendous quantities of land not being used entirely for highway and use such lands as a transcontinental grid system to connect power lines and gas and oil lines. The problem of course is that there is so much more that we are going to have to be transferring. If we pursue for example the concept of a national water bank and we have to start transferring so called surplus water from region to region, then that will have to be done by pipeline.

But we do have with the interstate system in the United States, broad corridors which would permit us to do many things. Some people are also talking about taking the abandoned rail lines and not permitting them to go back to other ownership or to be sold as assets but to use them as lines for this purpose. Unfortunately many of them are quite narrow and many of them were acquired by the railroads under peculiar deeds on the assumption that the railroad would never cease to exist and therefore it didn't really matter what sort of reversion clauses you had in them.

Lea: One area is the high-speed ground transport, and there is no question that we are moving in the direction of developing a high-speed ground system, particularly tied to super airports. This may give us a possibility of

developing a transport network which would tie together and make a system out of a series of urban regions. There are still a number of problems left, but there has been a great deal of work done on this, on the Montreal-Toronto corridor, in the New York-Washington corridor and there are some quite significant developments going on elsewhere, particularly in Europe.

The high-speed, intercity systems connected with a few regional airports, have a chance of influencing the community of large cities. The problem is that somebody with a lot of cash has to have the commitment to the concept; and this is the real rub. If somebody with money will have enough commitment to the concept, then there is certainly something that transport can do to contribute. So far, this has not been so.

6.4 The Best Possible Means

But it will not be "someone" . . . , it will have to be all who make decisions which bind the future and who have the responsibility to act: governments, private industry, cultural institutions, scientific community and individuals as well; and not dealing with transport only, but with the settlement as a whole. Dr. C.A. Doxiadis, continues in his paper:

How can we select the best possible means for achieving the goal of a desirable and feasible Great Lakes Megalopolis System?

In order to answer this question, we have applied the IDEA method (Isolation of Dimensions and Elimination of Alternatives method) not only to select the best alternatives for the Great Lakes Megalopolis System, but also to find the best road to follow. The conclusions are the following:

- 1 To let the present situation continue with no overall plan or even any overall concept is disastrous and therefore excluded.
- 2 To demand an administrative reorganization that will create an authority in charge of this problem is not realistic, because even if it could finally be agreed upon, the process would take so long that the situation would become worse and the solution more difficult and more expensive.
- 3 To create a new authority just for planning, would again take a lot of time.
- 4 Of many alternatives, one came up as realistic and practical: to continue the efforts which have been carried out through private initiative over almost 10 years and come to general conclusions in 15 months and detailed conclusions in 2 years.

If this road is to be followed, the process will be as follows:

- 1 The general conclusions will be presented to the interested states, provinces, and regional authorities.
- 2 These findings (the best alternatives and their classification) will give the choice to the state and provincial authorities to select the best one for their purposes. This will be easily done as the findings will include special ratings for each criterion and give the possibility of reorganizing them in accordance with preferences regarding their relative importance.
- 3 At the same time the states and provinces will have the opportunity to decide whether to create an authority to coordinate all planning or to handle special aspects of implementation, because the study will make clear which are the sectors where action is needed at the level of the Great Lakes Major Region and which parts do not have to become the concern of the whole area.
- 4 Throughout this process (points 1, 2, 3) all local authorities will receive the study and have the opportunity to decide which road they prefer to take in relation to the overall concept of each coordinated system. Some may prefer to become fully connected and receive all the benefits of interaction (economic, social, technological, etc.). Others may prefer to keep out of participation (at least for a certain period) and to retain the benefits of relative isolation if they think that this gives them a higher quality of life.

These are the benefits of the creation of a broad system which can give each urban system and each community the opportunity to make their own decisions for their own benefit.

Industries, and distributors of goods can clearly identify those areas which will best serve their interests. These will become the special industrial and commercial areas which can serve not only the whole megalopolis but also the entire North American continent and the world.

On the other hand, all groups and authorities interested in protecting existing values (natural, cultural, etc.) or reviving those which have already been eliminated will have the opportunity to act in time, since they can take part in decisions as to which areas shall be transformed by modern technology into transportation and utility corridors. This will eliminate the need of having to react daily to new decisions which upset everything.

By selecting the road of guided growth, the whole Great Lakes Major Region can achieve the two natural and indispensable goals: on the one hand, growth and development, and on the other, high quality for the total environment.

7 Summary Statement

Dr. Margaret Mead summarizes the proceedings of the Symposium:

I think that it is worth emphasizing that many things have been taken for granted here, by those of us who are used to speaking to each other and who have participated in the activities of the 10 years of Delos Symposia. We have not said, as we should have, that the reason we are thinking about human settlements, is because we care about people and how they live; that under modern conditions, we can no longer leave the course of such settlements to the slow adjustment of chance and time. There is a belief that somehow, human beings were able to ensure their own survival; but this is not so. Throughout history, thousands and thousands of communities have gone down. We have not any idea how many communities and civilizations have disappeared, and we have no guarantee that human communities have any innate ability to save themselves.

The basic assumptions under which we are working are that we now have a system, which, if we do not take thought, will destroy us; and that we have the capacity to take thought as we have never had before.

We have instruments that make it possible for us to deal with much larger bodies of information, while that information is still relevant, and not two or three thousand years later or even a decade later.

This Symposium was convened on this spot, to discuss something new that suddenly exists on this earth, but I think it has been heavily confused by the word "inevitable," which suggests that megalopolis has not happened yet. Is death inevitable? The interjection of the word "inevitable" has, for a while, confused the issue. But it's nonsense. Megalopolis is here and it is just as silly to ask if it is inevitable, as it would have been for people in Rome to have asked: "Is the city inevitable?", as if it was going to occur later! Megalopolis is here. Deal with it!

We have been focussing here on a recognition, and a definition of this new evolutionary phenomenon, which is defined in terms of the number of people, the degree of density, the number of links that take different nuclei and relate them to each other; and I hope now that in the course of the discussion, we have finally disposed of the people who have no use for megalopolis, who wish it would go away. "Who needs it?" is not a relevant question. Megalopolis is here.

We belong to the first age on this earth that has been able to name itself. The old stone age did not name itself and it did not realize that it was old and

there would be a new stone age. The Industrial Revolution did not name itself; but three weeks after Hiroshima, the atomic age was named and named by a people who were conscious enough of what was happening, to say: "The bomb has made a major change. We are in a new era; let's deal with it." We are in the unique situation because we know what is happening to us, while it is happening; and what we are trying to do is to raise awareness to a point where specialists and laymen, citizens and professionals, can deal with a significant new phenomenon that subsumes most of the other things that are happening in the world.

In the last 25 years, the motor cars have gone everywhere and the road for the motor car to ride on, has gone everywhere; one of the effects of that is that some people have stepped out of the stone age to have an electric razor and a transistorized radio pushed into their hand. From one point of view, then, we have all come into the same world, although we came in from different backgrounds.

My feeling is that we have not used much of our humanity yet; and we haven't used much of our capacity to think with the speed of light or possibly faster; and we have not used much of our capacity to relate to other people. Far from turning ourselves into myths or machines, we have a tremendous possibility of drawing on human capacities if we can relate them to changes of scale. One of the overriding problems that has come up over and over again, whether we are discussing government or delivery of services or networks, is the problem of scale. One thing that human beings have not yet discovered, is how to retain the advantages of the small scale; of remaining a human being; of learning to relate to enough known people so that we have variety; and of graduating that relationship up to a global level.

But just as we have been able to move from small human communities which defined 30 or 40 people as human and the rest of the world as prey or predator; just as we have been able to do this, I think if we concentrate on getting the scale right, and not doing things on a national basis that ought to be continental, and not doing things on a continental basis that ought to be global, and not doing things on a global basis that ought to be on a neighbourhood basis, then, I think we will succeed. This whole problem of scale is highlighted vividly by all the discussions we have had on the intricacies of megalopolis, and it focusses our attention on the new area, on the fact that megalopolis, the new unit of human settlement, makes it possible to think about virtually our entire human dilemma. That is the reason that human settlements were put into the Stockholm agenda, and that

is what we have to do at the Vancouver UN Conference — use our knowledge of human settlements as a way of thinking about our total human problem.

Although it has not been discussed at great lengths, we need to recognize that our hope is that we can do better with megalopolis than we did with metropolis. I think that this is a serious theoretical point that has not, as far as I can see, been resolved by any of our specialists. It is important that we ask: if we fail at one stage does that really compromise our next stage or not? If we had been terribly good at running cities, would we be better or worse off now, when we have to run something that is of a different order; and I don't think we know for certain. But we certainly do know that we have never been good at running cities and that in every great city in the world, we sometimes sacrifice up to a quarter of the population to juvenile delinquency, to alienation, to mental retardation, and to hunger. We have never been able to master the management of a city even to the level of serving human needs. Will we now be able, with our new consciousness, with our comparative knowledge of what's happening in different parts of the world, with our knowledge of what's going on in Japan, in France, in Scandinavia, in Calcutta; with this comparative knowledge which is immediately available to all of us now, will we be able to do better

with megalopolis than we've done with metropolis? We do not know whether our past failures will make it easier to succeed, or whether they will compromise our successes.

We have seen some instances where people who come into the modern world without the complications of some of the errors and mistakes that we have made, can greet their own complications much more freshly and much more easily than we do. One of the ways of defining the peasantry of the world is that they are the people who have been taught for thousands of years that they didn't understand much; so it follows that the places where people have been taught that they did not understand anything are dreadful obstacles to moving forward. Possibly because the phenomenon of megalopolis is new, we have been living in something that we did not know was there, but are just now recognizing that it is there; We might be able to approach it much more freshly, if we now recognize that it is new, we may not be as compromised by old solutions, as we might have been otherwise.

I do not think we know this for certain. It will depend on how hard we are willing to work for our future.

The Door Opens...

"The fact that this Symposium has taken place means that the world will have been changed in some measure immediately."

Dr. Margaret Mead made this point in her Summary Statement. Hopefully, it was so, because that was one of the objectives of the Symposium. Similarly then, the fact that the reader has read this volume, means that the reader will have been changed, in some small measure immediately.

Both the Symposium and this volume combined, could be seen as instruments of change, media which would facilitate and enhance that fundamental transition through which mankind is now going — from civilization to ecumenization — but this time awake.

The subject and the scale are new to us; sometimes they might even be somewhat frightening; but the only choice is to step forward and act creatively. Man has become responsible for his actions at all scales. That is a seal of the epoch through which we are now moving.

The Editors

Glossary

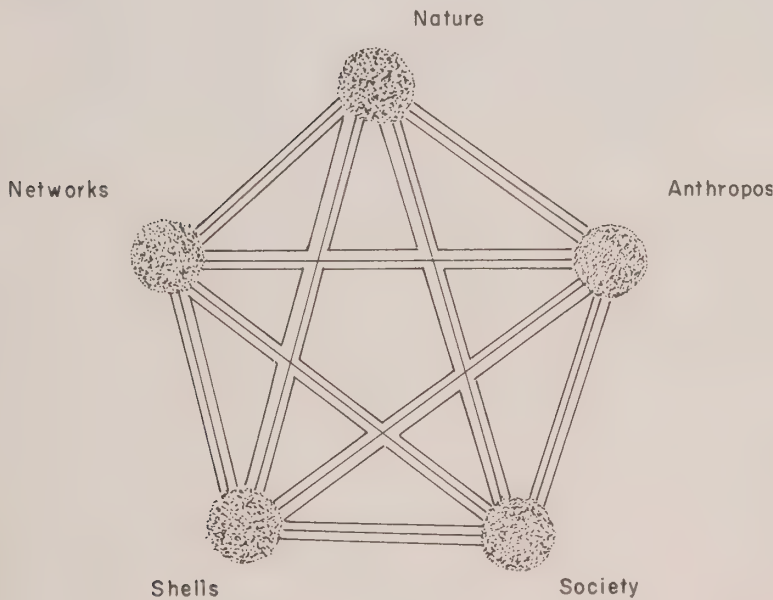
- Conurbation

A system of metropolis with related cities, towns and villages (i.e. Toronto and Buffalo) grouped in a broader region. (Population range 3 million to 25 million)
- Ecumenopolis

The complex coalescence of several megalopolises in the remote future, interconnected in such a way as to span all the habitable world. (Population range 20 to 40 million.)
- Ekistics

The science of human settlements developed by **C.A. Doxiadis** which postulated that
 - human settlements at varying size scales operate according to *fundamental principles* and
 - that there are *basic elements common* to all human settlements.

Ekistic Elements



Ekistic Grid

COMMUNITY SCALE		I	II	III	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
EKISTIC UNITS		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		ANTHROPOS	ROOM	HOUSE	HOUSE GROUP	SMALL NEIGHBORHOOD	NEIGHBORHOOD	SMALL POLIS	POLIS	SMALL METROPOLIS	METROPOLIS	SMALL MEGALOPOLIS	MEGALOPOLIS	SMALL EPEROPOLIS	EPEROPOLIS	ECUMENOPOLIS
ELEMENTS	NATURE															
	ANTHROPOS															
	SOCIETY															
	SHELLS															
	NETWORKS															
SYNTHESIS HUMAN SETTLEMENTS																
MEDIAN POPULATION N (Millions)		1	2	5	40	250	1,500	10,000	75,000	500,000	4M	25M	100M	1,000M	7,500M	50,000M
		Ekistic Logarithmic Scale														

Ekistic Logarithmic Scale (Els)

A classification of settlements according to their size, presented on the basis of a logarithmic scale, running from Anthropos (unit 1), as the smallest unit of measurement, to the whole earth (unit 15). The ekistic logarithmic scale can be presented graphically, showing area or number of people corresponding to each unit, etc., so that it can be used as a basis for the measurement and classification of many dimensions in human settlements.

GLM

Great Lakes Megalopolis; a term used to describe the system of human settlements in the U.S.A. and Canada around the lower Great Lakes.

GLM-C

Great Lakes Megalopolis-Canada; a term used to describe the system of human settlements in Canada around the north shores of Lake Erie, Lake Ontario and the St. Lawrence River.

Megalopolis

Several urban conurbations aligned along a particular shape where the surrounding regions are each unique because of the presence of the metropolises as their centres. (Population range 25 million to 250 million) (Papaioannou)

Very large polynuclear urbanized systems endowed with enough continuity and internal interconnections for each of them to be considered a system in itself; and separated by less urbanized broad spaces from any other large urban network that it does not encompass. (Gottmann)

Metropolis

A large city with a central core and extending into the surrounding region by a system of discontinuous shapes

with open spaces in between. (Population range 1 million to 3 million)

NOUS

The Northern Ohio Urban System; a term used to describe the system of human settlements in the U.S.A. focussed on Cleveland, Ohio.

UDA

The Urban Detroit Area; a term used to describe the system of human settlements in the U.S.A. and Canada focussed on Detroit, Michigan.

Notes

1 Megalopolis — What is it?

- 1 Doxiadis, C.A., and Papaioannou, J.G., *Ecumenopolis, the Inevitable City of the Future*, Athens Center of Ekistics, Athens, Greece, 1974.
- 2 Geertz, Clifford, "On the Nature of Anthropological Understanding", in *American Scientist/Sigma XI*, Jan./Feb. 1975, pp. 47-53.

2 Big Pattern Changes

- 1 Doxiadis, C.A., and Papaioannou, J. *Ecumenopolis, the Inevitable City of the Future*, Athens Publishing Center, Athens, Greece, 1974, p. 40.
- 2 Doxiadis, C.A., *Ecumenopolis: the Settlement of the Future*, Research Report No. 1, Athens Center of Ekistics Publication Series, 1961.
- 3 Dubos, R., and Ward, B., *Only One Earth: The Care and Maintenance of a Small Planet*, W.W. Norton and Co., N.Y. 1972.
- 4 Christakis, Alexander N., "A New Policy Science Paradigm", *Futures*, Vol. 5, no. 6, December, 1973.
- 5 Hasan Ozbekhan compiled an interesting list of continuous critical problems for the Club of Rome proposal on *The Predicament of Mankind*, Spring 1970.
- 6 Doxiadis, C.A., *Ekistics: An Introduction to the Science of Human Settlements*, Hutchinson of London, 1968.
- 7 Christakis, A.N., "Toward a Symbiotic Appreciation of the Morphology of Human Settlements", in *Portraits of Complexity*, Battelle Monograph No. 9, June 1975.
- 8 Elgin, Duane, "The Politics of Large, Complex Systems — The Limits to Urban Democracy", in *City Size and the Quality of Life*, National Science Foundation contract, GI.138462.
- 9 Beer, Stafford, *Platform for Change*, John Wiley & Sons, 1975, p. 59.

4 The Great Lakes Megalopolis

- 1 Gottmann, J. *Megalopolis*, Massachusetts Institute of Technology Press, Mass., 1961.
- 2 Papaioannou, J. *Megalopolis — A First Definition*, Athens Center of Ekistics, Report No. 2, 1967.
- 3 Doxiadis, C.A. *Emergence and Growth of an Urban Region*, Detroit Edison Co., Detroit, U.S.A. 1970, p. 164.
- 4 Papaioannou, J.G. *Megalopolises: A First Definition*, Athens Center of Ekistics, Athens, Greece, 1968.
- 5 Bibliographical reference for Professor Yeates' paper includes:
Harvey, D. (1973) *Social Justice and the City*, London, Arnold.
Yeates, M. (1975) *Main Street: Windsor to Quebec City*, Toronto: Macmillan of Canada.
Russwurm, L. (1970); *The Development of an Urban Corridor System: Toronto to Stratford Area, 1941-1966*, Toronto: Government of Ontario.
Curry, L. and G. Bannister. (1974). "Forecasting Township Populations in Ontario, From Time-Space Covariances" in L. Bourne, et. al. *Urban Futures for Central Canada*. Toronto: University of Toronto Press, p. 34-59.

5 What are the Issues?

- 1 Dubos, R. and Ward, B., *Only One Earth: The Care and Maintenance of a Small Planet*, W.W. Norton and Company Inc., New York, 1972.
- 2 For further elaboration, see Yeates, M. *Main Street: Windsor to Quebec City*, Macmillan of Canada, Toronto, 1975.

Co-Chairmen

- Leman, Alexander B.** (Mr.) Canadian Architect-Urbanist; President, Leman Group Inc., Co-Chairman, Great Lakes Megalopolis Symposium, Toronto, 1975.
- Mead, Margaret** (Dr.) U.S. Anthropologist; Co-Chairman, Great Lakes Megalopolis Symposium, Toronto, 1975; Adjunct Professor of Anthropology, Columbia University; President, Scientists' Institute for Public Information.

- Bourne, Larry S.** (Dr.) Canadian Urban Researcher; Director, Centre for Urban and Community Studies, University of Toronto.
- Bower, Robert J.** (Mr.) Canadian Planner; Commissioner of Planning, Metropolitan Toronto Planning Department.
- Brown, H. J.A.** (Mr.) Canadian Educational Administrator; Superintendent of Business Affairs, The Peel Board of Education.

Participants

- Abraham, Abraham N.** (Mr.) Canadian businessman; President, Comprehensive Management Services.
- Andrews, Stewart M.** (Mr.) Canadian Urban Development Consultant; President, Canada Realities Limited.
- Atkinson, Don** (Mr.) Canadian Communications Executive; General Supervisor, Business Planning, Headquarters Planning, Bell Canada.
- Beatty, James** (Mr.) Canadian lawyer; Beatty, Bower, Greenslade, and Hall.
- Bell, Gwendolyn, K.** (Dr.) U.S. Planner and Geographer; Editor, "Ekistics" Journal.
- Bellam, Leonard** (Mr.) Canadian Public Servant; Priorities and Planning Division, Ministry of State for Urban Affairs.
- Bentz, Jorg** (Mr.) Canadian architect/planner; Leman Group Inc.
- Blumenfeld, Hans** (Dr.) Canadian Planning Consultant, Professor of Planning, Department of Urban and Regional Planning, University of Toronto.

- Christakis, Alexander N.** (Dr.) American Nuclear Physicist and Ekistician; Visiting Lecturer, Psychology Department, Georgetown University, Washington, D.C.
- Coblentz, H.S.** (Dr.) Canadian Planner and Educator; Director, School of Urban and Regional Planning, University of Waterloo.
- Cox, John** (Mr.) Canadian Public Servant; Director of Priorities and Planning, Ministry of State for Urban Affairs.
- Cunningham, Wallace** (Mr.) Canadian Architect Planner; Manager, Planning and Urban Affairs, Board of Trade of Metropolitan Toronto.
- Dator, Jim** (Prof.) U.S. Futurist; University of Hawaii.
- Doxiadis, Constantinos A.** (Dr.) Greek Architect and Ekistician; Chairman, Doxiadis Associates International Co. Ltd., Consultants on Development and Ekistics, Athens, Greece, and of the various affiliated companies abroad.
- Ellis, Jack B.** (Prof.) Canadian Educator and Environmentalist; Professor, Department of Environmental Studies, York University.
- Fischer, David** (Prof.) Canadian Educator and Environmentalist; Professor, Department of Man-Environment Studies, University of Waterloo.

Francis, George R. (Dr.) Waterloo, Ontario	Canadian Educator and Environmentalist; Chairman of the Department of Man- Environment Studies of the University of Waterloo.	Isomura, Eiichi (Mr.) Tokyo, Japan	Japanese Sociologist; President, Toyo University and Japan Society of Urban Studies; President World Society for Ekistics; Director, Institute for Sociological Studies; Executive Director, Japan Center for Area Development Research.
Fuller, R. Buckminster (Dr.)	U.S. Design Scientist and Engineer; Professor, University City Science Center. Distinguished University Professor, Southern Illinois University; President, Fuller and Sadao, Inc., Cambridge, Mass.	Jackson, C. Ian (Dr.) Ottawa, Ontario	Canadian Public Servant; Executive Director of the Canadian Participation Secretariat for Habitat: United Nations Conference on Human Settlements.
Goldenberg, Aviva (Mrs.) Toronto, Ontario	Israeli Architect/Planner; Leman Group Inc.	King, Bill (Mr.) Toronto, Ontario	Canadian; President, Rochdale College.
Gottmann, Jean (Dr.) Oxford, England	French Geographer; Professor of Geography at Oxford University, England, and Professor on leave at the Ecole des Hautes Etudes en Sciences Sociales, Sorbonne.	Langan, Thomas (Dr.) Toronto, Ontario	Canadian Philosopher; Professor of Philosophy, University of Toronto.
Hare, F. Kenneth (Dr.)	Canadian Environmentalist; Director of the Institute for Environmental Study, University of Toronto.	Langley, John V. (Mr.) Toronto, Ontario	Canadian Architect; District Real Estate Architect, Bell Canada.
Hatcher, Harlan (Dr.) Ann Arbor, Michigan	U.S. Educator and Environmentalist; President of the Developing Great Lakes Megalopolis Research Project Inc.	Lea, Norman D. (Mr.) Toronto, Ontario	Canadian Transportation Planner; President, N.D. Lea and Associates Limited.
Havlick, Spenser W. (Dr.) San Jose, California	U.S. Resource Planner; Associate Professor, Department of Environmental Studies, California State University, San Jose.	Leman, Edward (Mr.) Ottawa, Canada	Canadian Student; Carleton University, Ottawa; Coordinator for the Great Lakes Megalopolis Symposium.
Heavenrich, Herbert S. (Mr.) Milwaukee, Wisconsin	U.S. Planner; University of Wisconsin-Milwaukee.	Leman, Ingrid (Miss) Toronto, Ontario	Canadian Graduate Student, Department of Philosophy, University of Toronto.
Higgins, Larratt T. (Mr.) Toronto, Ontario	Canadian Utilities Planner; Ontario Hydro.	Lourie, Reginald S. (Mr.) Washington, D.C.	U.S. Child Psychiatrist; Professor of Psychiatry and Child Health and Development, George Washington University; President and Chairman, Joint Commission on Mental Health of Children.
Holmes, Robert S. (Mr.) Milton, Ontario	Canadian Municipal Administrator; Housing Co-ordinator, Ontario Housing Action Programme.	Maltby, James (Mr.) Washington, D.C.	U.S. Architect/Planner; Vice-President, Doxiadis Associates Inc.
Howarth, Thomas (Dr.) Toronto, Ontario	Canadian Architect/Planner; Commissioner, National Capital Commission.	McLaughlin, S. Bruce (Mr.) Mississauga, Ontario	Canadian Urban Developer, Lawyer; President, McLaughlin S.B. Associates Limited.
Ind, Peter (Mr.) Toronto, Ontario	Canadian Architect; Ontario Ministry of Housing.	McLuhan, Marshall (Dr.) Toronto, Ontario	Canadian Professor of English; Director, Centre for Culture and Technology, University of Toronto.

- Miles, Simon** (Mr.)
Toronto, Ontario
Canadian Urban Researcher;
Executive Director, International Association
for Metropolitan Research and Development.
- Misner, A.D.** (Dr.)
Toronto, Ontario
Canadian Educator/Planner;
Professor, Institute for Environmental Studies,
University of Toronto.
- Murphy, Earl F.** (Dr.)
Columbus, Ohio
U.S. Law Professor;
Professor of Law, Ohio State University;
Chairman, American Institute for Urban &
Regional Affairs, 1968.
- Murphy, Joanne Wharton**
(Dr.)
Columbus, Ohio
U.S. Educator;
Adjunct Professor of Banking Law, Ohio State
University College of Law, University
Ombudsman.
- Nash, Peter H.** (Dr.)
Waterloo, Ontario
U.S. Planner and Geographer;
Dean, Faculty of Environmental Studies,
University of Waterloo, Canada.
- Nee, David** (Mr.)
Toronto, Ontario
U.S. Architect;
Leman Group Inc.
- O'Donohue, Tony** (Mr.)
Toronto, Ontario
Alderman; Canadian Politician and Engineer;
Member of Metropolitan Toronto Council.
- Papaioannou, John G.** (Mr.)
Athens, Greece
Greek Architect, Planner and Musicologist;
As Musicologist, responsible for the "Skalkittas
Archives"; Co-Director, Studio for New Music;
Professor of History of Music, Athenaeon,
Athens.
- Peter, George** (Mr.)
Toronto, Ontario
Canadian Planner;
Director of Long Range Studies, Metropolitan
Toronto Planning Department.
- Plant, Raymond M.** (Mr.)
Hamilton, Ontario
Canadian Municipal Lawyer;
Regional Solicitor, Hamilton-Wentworth
Court House.
- Psomopoulos, Panayis** (Mr.)
Athens, Greece
Greek Architect and ekistician;
Vice-President, Athens Center of Ekistics;
Secretary-General and Treasurer, World
Society for Ekistics.
- Rapoport, Amos** (Mr.)
Milwaukee, Wisconsin
Australian Architect/Planner;
Professor of Architecture and Anthropology,
School of Architecture, University of
Wisconsin-Milwaukee.
- Reed, Robert** (Mr.)
Ann Arbor, Michigan
U.S. Water Resources Planner;
Great Lakes Basin Commission.
- Scrivener, Margaret** (Mrs.)
Toronto, Ontario
Canadian politician; Member of Ontario
Provincial Parliament for St. David.
- Seliga, Thomas A.** (Prof.)
Columbus, Ohio
U.S. Educator and Environmentalist;
Director, Atmospheric Research Laboratory,
School of Electrical Engineering, Ohio State
University.
- Sheff, G.** (Mr.)
Toronto, Ontario
Canadian Urban Developer;
Cadillac Fairview Corporation Ltd.
- Sigoreo, Igor** (Mr.)
Toronto, Ontario
Yugoslav Dipl. Ing. Architect;
Leman Group Inc.
- Smale, Catherine** (Mrs.)
Simcoe, Ontario
Canadian Architect and Politician;
Councillor for the Region of Norfolk-
Haldimand
- Smith, John W.M.** (Mr.)
Toronto, Ontario
Canadian Communications Executive;
Assistant Vice-President, Public Relations,
Bell Canada.
- Strawbridge, Herbert E.**
Cleveland, Ohio
U.S. Department Store Executive;
Chairman of the Board, The Higbee Company,
Cleveland, Ohio; President, Northern Ohio
Urban System Research Corporation, Inc.
- Taylor, Don** (Mr.)
Toronto, Ontario
Canadian Regional Planner
Community Planning Branch, Ministry of
Treasury, Economics and Intergovernmental
Affairs, Province of Ontario.
- Trutko, Jim** (Mr.)
Cleveland, Ohio
U.S. Planner;
Northern Ohio Urban System Research
Corporation Inc.
- Van Ginkel, Blanche** (Mrs.)
Montreal, Quebec
Canadian Architect/Planner;
Van Ginkel Partners.
- White, Norman F.** (Dr.)
Hamilton, Ontario
Canadian Psychiatrist;
Department of Psychiatry, St. Joseph's
Hospital.
- Wise, Arnold S.** (Mr.)
Toronto, Ontario
Canadian Economist-Planner/Urban Designer;
Associate of Leman Group Inc.; Programme
Manager for the Great Lakes Megalopolis
Symposium.

Wolfe, Jeanne (Ms.)
Montreal, Quebec

Canadian Planner;
Urban Planning Department, McGill University,
Montreal, Quebec.

Wolfe, Roy I. (Dr.)
Toronto, Ontario

Canadian Geographer;
Research Geographer, York University,
Ontario.

Yeates, Maurice (Dr.)
Kingston, Ontario

Canadian Educator and Geographer;
Professor and Head of Department of
Geography, Queen's University, Kingston,
Ontario.

Zepic, Xenia, (Mrs.)
Toronto, Ontario

Canadian Planner and Urban Designer;
Principal Planner, Municipality of
Metropolitan Toronto Planning Dept.

